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ABSTRACT

This report, the result of an 18-month study by the NAS Institute of Medicine, Committee to Study the Role of Allied Health Personnel (including two workshops with invited experts), examines the diverse set of health care occupations that fall under the umbrella term "allied health." The report is organized in eight chapters. Chapter 1 introduces the concept of allied health occupations and traces briefly the evolution of 10 fields. Chapter 2 examines various data sources and discusses ways of forecasting the demand for and supply of allied health personnel. Chapter 3 looks at forces such as demography, disease patterns, the structure of the health care delivery system, and women's study choices that have an impact on the demand and supply of allied health personnel. Chapter 4 reviews national projections of the demand for allied health workers up to the year 2000. In Chapter 5, recommendations are offered to increase recruitment of students, including minority students, into allied health education programs and to improve the capacity of educational institutions to deliver allied health programs. Presenting the employer's perspective, Chapter 6 reviews options for correcting and adapting to supply imbalances and outlines a role for health care administrators in enhancing the size and effectiveness of the allied health work force. Chapter 7 discusses state licensure and other types of control of allied health personnel. Chapter 8 examines long-term care and the needs it poses for allied health personnel. Each chapter contains references. Appendices include the Congressional mandate, list of workshop participants, list of allied health job titles and program classifications, data on labor supply/demand estimates and projections, criteria for approval of certifying agencies, and a list of historical source material. (KC)

ED307395

Report to Congress on the Study of the Role of Allied Health Personnel in Health Care Delivery

Allied Health Services: Avoiding Crises
Report of a Study

Division of Health Care Services
Institute of Medicine
National Academy of Sciences

JUNE 1988

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PREFACE

This report is the result of an 18-month study by a committee of the Institute of Medicine to explore policy issues surrounding the roles of allied health personnel.

Prompted by a congressional mandate contained in Public Law 99-129, the Health Professions Training Act of 1985 (Appendix I), and implemented through a contract with the Health Resources and Services Administration of the Department of Health and Human Services, the study represents the first major independent examination of the diverse set of health care occupations that often fall under the umbrella term "allied health".

Study Background

Although some allied health fields such as dietetics date back to the 19th century, it was the federal health professions legislation of the 1960s that gave life to the concept of a collectivity now known as allied health personnel.

Despite the withdrawal of most direct federal support for allied health education in the early 1980s allied health leaders convinced Congress that such a large part of the health care workforce (ranging in estimates from one to almost four million people) should not continue to go unmonitored and unstudied, especially when so much about the health care system is undergoing sweeping change. There is increasing pressure from both public and private sectors to curtail costs; there is introduction of new sophisticated health technologies; there are growing numbers of elderly; there is increasing attention to individuals with chronic disabilities; and there are drastic developments in disease, such as the acquired immune deficiency syndrome (AIDS) epidemic.

How the health care system adapts to these pressures depends in large part on whether workers with the requisite education are available at the right place and time. Thus, careful assessment of future personnel needs has never been more important than now. However, making sound policy decisions about education, regulation and other matters that affect supply and demand for allied health personnel is difficult. This is in part because they have been among the least studied elements of the health care system. In response to this deficiency, in 1985 Congress mandated this national study.

Interpretation of the Congressional Charge

Congress posed five tasks for this study. These inquiries were not raised in the specific context of existing or proposed federal legislation, but rather a broader concern that a large body of health care workers has received insufficient attention relative to their importance in future health care. In effect, Congress asked for information about this major component of the health workforce in order to determine whether corrective action is needed, and if so, where responsibility for such action rests.

CONGRESSIONAL STUDY CHARGE

1. Assess the role of allied health personnel in health care delivery.
2. Identify projected needs, availability, and requirements of various types of health care delivery systems for each type of allied health personnel.
3. Investigate current practices under which each type of allied health personnel obtain licenses, credentials, and accreditation.
4. Assess changes in programs and curricula for the education of allied health personnel and in the delivery of services by such personnel which are necessary to meet the needs and requirements identified pursuant to paragraph (2).
5. Assess the role of the Federal, State and local governments, educational institutions, and health care facilities in meeting the needs and requirements identified pursuant to paragraph (2).

The study committee was directed to assess the role of allied health personnel in the delivery of health care. The committee has interpreted this charge as a request for better knowledge about the ways in which allied health practitioners are deployed, their functions, their relationships with other health care practitioners, and the settings in which they work. In addition, the charge has been interpreted as a need for elucidation of the various factors and forces—education and training, employer requirements, third party payer policies, the regulatory apparatus, to name several important ones—that shape that role.

The second item in the congressional charge, in effect, asks the committee to provide its best judgment as to whether the needed future services of allied health practitioners will be available. This raises questions about the way the allied health labor market operates and whether market adjustments can be expected to take place (for instance, salary increases if demand for personnel should outpace supply) before service dislocation or quality erosion occurs. Although much of the report addresses the likely future market demand for allied health workers, the committee has not overlooked the fact that some important service needs may not be met now. Long-term care provides a current example of the lack of good jobs and reimbursement undermining the nation's ability to supply some basic services.

In the charge's third item, Congress requests an examination of licensure and other forms of credentialling in allied health fields. The committee believes this expresses a concern about the imbalance between the costs and inefficiencies of regulation on one hand and the need to protect consumers from poor quality care on the other. To make the desired adjustments a better understanding is needed of the current situation, the contribution of regulation to quality, and the diverse costs of regulation.

The fourth item of the congressional charge--an examination of education programs and curricula--relates to concern about whether they are keeping in step with the changing nature of health services. The committee also interpreted this segment of the charge to include a consideration of whether allied health education programs are likely to be able to compete for higher education resources and for students interested in pursuing technically oriented careers.

The final congressional request is for an assessment of the abilities of the major legislative, educational, and health care entities to make the adjustments that will ensure that allied health personnel can fulfill their potential in the future health care delivery system. If intervention is needed, who has the final responsibility and leverage to act, and how can they know when and how to intervene?

Study Approach

To address the questions posed by Congress, the committee and study staff solicited information from a broad array of organizations, including the allied health professional associations, state regulatory agencies and higher education coordinating bodies, and federal agencies such as the Bureau of Health Professions and the Bureau of Labor Statistics. The committee held two workshops with invited experts and a public meeting on the regulation of allied health personnel. The first of the two workshops concerned the future demand for allied health workers; the second concerned education and supply of workers. (Appendix II provides a list of participants to each of these meetings.) The staff and committee members visited health care provider institutions, including several long-term care facilities, HMOs, and a multi-hospital system.

The committee has not collected primary data, but has used existing data from a variety of sources to focus on important policy issues. These policy issues were explored primarily through an examination of ten allied health fields. Individually, these fields represent different facets of allied health occupations. Collectively they reveal some common threads in the way all allied health fields can respond to the challenge of changing health care systems.

This study is a first step toward addressing a neglected topic in health care policy. The committee did not have the benefit of large-scale sample surveys nor an extensive body of empirical literature. Recognizing that a rich data base may not be in the immediate future for allied health, we suggest strategies for enhancing existing data to improve the grounds on which decision-makers act.

Allied health is an ill-defined term. Because there is no concensus about which occupations constitute allied health, and because the more comprehensive definitions encompass so many fields that study is impracticable, the committee settled upon a set of fields that exclude some occupations that readers might expect to find. Among those excluded are nurses, nurse practitioners, midwives, physician assistants, pharmacists, and social workers and mental health counselors. Guiding the committee's selection of study fields was the federal health professions legislation and the need to cast light upon large but relatively unstudied occupations.

Major Study Themes

The following report is intended for a wide audience: allied health professional organizations, administrators at educational institutions, state regulatory and licensing bodies, employers of allied health personnel, and policymakers at both the state and federal levels. Although the study's findings are most often based on national data and trends, the analysis is intended for use by all actors looking to the future including those at the local level—the college administrator considering whether to offer allied health programs, the legislature voting on a licensure law, the home care agency setting salary levels for employees, and the therapist considering whether to establish an independent practice.

The reader will wish to be alert for several themes that have guided the Committee in determining areas for recommendations to its audiences. These themes, derived from the study activities and interwoven throughout the report, include:

- allied health personnel as an under-recognized but important human resource

- the need for data and research to provide the basis for more effective use of allied health personnel
- the need for health care and education institutions to assist each other in adjusting to new realities in the way services will be delivered in the future
- the fragility of some of the education programs that provide new entrants into the fields
- the importance of competitive levels of compensation in a labor market where individuals with technical and service oriented skills will be at a premium
- balancing quality concerns with those of cost, flexibility, and employment opportunity in the regulatory policy arena.

Organization of the Report

Chapter 1 introduces the subject of this study, allied health occupations, and briefly traces the evolution of 10 fields. Chapter 2 examines various data sources and discusses ways of forecasting the demand for and supply of allied health personnel. Chapter 3 looks at forces such as demography, disease patterns, the structure of the health care delivery system, and women's study choices that impact on the demand and supply of allied health personnel. Chapter 4 reviews national projections of the demand for allied health workers up to the year 2000 and presents the committee's assessment of future demand and supply based on its own assumptions and projections of supply.

In Chapter 5, the committee addresses the contribution of educational output to future supply. Recommendations are offered to increase recruitment of students, including minority students, into allied health education programs and to improve the capacity of educational institutions to support allied health programs. Chapter 5 also discusses the levels and content of education needed to prepare practitioners for the future workforce.

In presenting the employer's perspective in Chapter 6, the committee reviews options for correcting and adapting to supply imbalances and charts a role for health care administrators in enhancing the size and effectiveness of the allied health workforce.

Chapter 7 describes the various mechanisms of control of allied health personnel, focusing principally on the problems state legislators face in making decisions about licensure and other forms of occupational regulation. The chapter emphasizes the need for flexibility in the functions of allied health personnel.

Chapter 8 takes up long-term care and the needs it poses for allied health personnel.

SUMMARY

This report results from the first large national study of the enterprise known as allied health. It identifies the major functions of allied health practitioners, who have been relatively unrecognized by health policymakers. This situation often leaves the policymakers unaware of the impact of their decisions on allied health services.

Allied health personnel are the majority of the health care workforce. They work in all types of care — primary, acute, tertiary, and chronic — and in all health care settings, including physicians' and dentists' offices, health maintenance organizations, laboratories, freestanding facilities offering special services, ambulances, home care, and hospitals. The level of training of allied health personnel is as varied as the care they provide and the settings in which they work. Allied health personnel include both highly educated persons and others with only on-the-job training. They work with widely varying degrees of autonomy, dependence on technology, and regulation.

But, there is a paucity of information about them. There is not even consensus on what the term "allied health" means. Compared with nurses, physicians, and dentists, the allied health workforce as a whole has been very little studied. Prompted by a congressional mandate and funded by the Health Resources and Services Administration of the U.S. Department of Health and Human Services, this study by the Institute of Medicine was intended to answer the following questions. First, what roles do allied health workers perform and how will these roles fit into a changing health care delivery system over the next 15 years? Second, what will be the future demand for allied health personnel and how can public and private policymakers ensure that the demand is met? Third, should these occupations be regulated and, if so, how? And fourth, what sorts of actions should educators take to prepare allied health practitioners for the workplace of the future?

The committee's recommendations are based on what existing evidence tells about some vital characteristics of the allied health labor market:

o the composition of the labor force—namely the predominance of technically competent women with a service orientation

o highly regulated professions and work environments

o education programs unable to compete effectively with other academic programs for limited resources and sufficient numbers of students o employers, undergoing sweeping changes in their financial incentives, who must make hiring, compensation, and workforce allocation decisions in the absence of good information.

Throughout the study, a major challenge for the committee has been both to capture the diversity of allied health occupations and to devise specific yet encompassing recommendations for those who must make policy decisions affecting allied health personnel. Toward this end, the committee chose to focus on 10 allied health fields. It used the following criteria in the selection of fields: that each of the 10 be large and well-known; that collectively they span the spectrum of autonomy; and that collectively they work in a wide variety of health care settings.

The fields selected are clinical laboratory technologists and technicians, dental hygienists, dietitians, emergency medical personnel, medical record administrators and technicians, occupational therapists, physical therapists, radiologic technologists and technicians, respiratory therapists, and speech-language pathologists and audiologists.

The committee hopes that this report is only the beginning of a process that will clarify the place of all allied health occupations in the health care delivery system.

Allied Health Personnel—Who are They and What Do They Do?

There have been many attempts to define allied health and to categorize the occupations that could be covered by umbrella definitions. Lacking a satisfactory definition of allied health, efforts to classifiy occupations have been focused on specific aspects of work and education such as patient-oriented groups versus laboratory-oriented groups, or on the level of education needed. The results of these attempts have not been enthusiastically embraced by allied health practitioners. The committee chose not to join in the search for a definition. The benefits of making the term precise are less clear than the benefits of continued evolution. The changing nature of health care makes some practices and practitioners obsolete while opening up opportunities for the formation of new groups. It is more important that pragmatism continue to prevail, that old and new groups draw what benefits they can from belonging to "allied health" than that a description of common characteristics define the group.

Rather than define allied health, the committee chose to examine policy-related characteristics of occupations that help explain how the fields are differently affected by changes in the health care environment. These characteristics include: amount of autonomy in the workplace, dependence on technology, substitution of one level and type of personnel for another, flexibility in location of employment, degree of regulation, and inclusion in accreditation standards for facilities.

Estimating Supply and Demand

In order to respond to the congressional charge "to identify projected needs, availability and requirements of various types of health care delivery systems for each type of allied health personnel", the committee had to resolve issues of scope and approach. Given limited funds and time the committee believed that its greatest contribution would be to try to clarify the future outlook, which is crucial to strategic planning and policy, rather than systematically assess the current situation.

Data Limitations

The committee's ability to fulfill its charge was severely hampered by lack of data, the result of a relatively low interest and investment of public resources in learning about the allied health workforce. The committee had to rely on data sources that include some information about allied health, however incomplete and unreliable. The committee assessed the existing data and conducted hearings, site visits, and workshops to round out its own expertise and help to understand the forces that will shape the future of allied health occupations. The committee could not make quantitative predictions of personnel shortages and surpluses, both because of the usual uncertainties of occupational projections, and the absence of the necessary data elements. If employers, higher education planners, federal and state officials, and others had soundly-based projections, decision making might be improved.

The federal government in its role as monitor of the nation's economic activity has a responsibility to monitor the health workforce and to inform participants in the health labor market and public policymakers of trends and developments. The work of the Bureau of Health Professions, the Bureau of Labor Statistics, and the Center for Education Statistics is to be commended and should be built upon. In order to improve the data on allied health fields, the committee recommends that the Secretary of Health and Human Services convene an interagency task force composed of representatives from the Bureau of Labor Statistics, the Center for Education Statistics, and other agencies that collect relevant data on the allied health workforce. This task force should work toward increasing the amount and improving the quality of data needed to inform public policy decision-makers, health care managers, unions, prospective students, and academic institutions about the allied health occupations.

To help implement this recommendation and others that follow requiring federal action, the committee recommends that the Department of Health and Human Services maintain an organizational focal point on allied health personnel to implement the grant programs recommended in this report, to coordinate the recommended work of the interagency data task force, and to facilitate communication between state legislative committees and the federal government.

Factors That Affect the Supply and Demand for Allied Health Personnel

A first step in understanding or projecting the future of allied health personnel, either as a group or for individual fields, is to understand the ways in which certain forces operating in the environment drive supply and demand. Early action in response to these forces can forestall the need for more radical corrections at a later date.

The Current Employment Situation

Available data do not enable a reliable estimate of whether the supply of practitioners in the various allied health fields is in reasonable balance with demand. However, during the course of the study, the committee was in contact with people who observe various portions of the labor market for allied health practitioners. These educators and employers expressed increasing concern about the availability of students and practitioners. Educators generally report that their graduates find jobs easily. Employers report increasing difficulties in filling vacancies. There are, of course, variations among fields and localities. The most frequent reports of shortage heard by the committee concerned physical therapists. For other fields there were reports of less severe shortages, or of hiring difficulties related to local conditions, changes in licensure, or a particular employer's problems. The volatility of the labor market was illustrated: at the beginning of the study some educators were concerned about an oversupply of clinical laboratory personnel; 18 months later the concern centered on a growing difficulty in hiring trained clinical laboratory personnel.

It is clear that some changes in the health care system are causing shifts in employment patterns. Prospective payment and other efforts to control hospital utilization caused initial reductions in hospital employment for some allied health fields. For other fields the rate of increase in hospital employment slowed, and still others showed a substantial increase. The growth of all sorts of out-of-hospital care has accelerated, creating some new sites for employment of allied health personnel. Whether in the long run these translate into substantial numbers of additional jobs or merely a shift in the location of employment is an important question not only for projecting demand for allied health personnel, but also because there are implications for the way personnel are educated to practice in new settings. Moreover allied health practitioners working in these new settings also raise issues for regulators concerned with quality and for traditional employers who must now compete for personnel with employers who can sometimes offer more attractive salaries and working conditions.

The committee used the best available data to make assessments of how the forces that drive supply and demand for allied health personnel will affect allied health labor markets. The intention is to alert decision-makers to the kinds and magnitudes of market adjustments that they should expect and encourage in order to sustain a long-term balance between supply and demand for allied health personnel.

It is the nature of markets to adjust eventually to change. Projected imbalances in supply and demand do not mean that shortage or surplus will occur. Rather, they signal that employers and potential employees must, and probably will, make adjustments. Only rarely do markets not accommodate changes in supply and demand. But there are inherent time lags and inefficiencies in the process that can be lessened by public and private interventions.

The Future Employment Situation

Barring major economic or health care financing contractions, growth in the number of jobs for allied health workers will substantially exceed the nation's average rate of growth for all jobs. Unless some existing trends are moderated, the flow of practitioners into the workforce through graduation from education programs will be, at best, stable.

For some fields, such as physical therapy, radiologic technology, medical record services, and occupational therapy, we foresee a need for decision makers to improve the working of the market so that severe imbalances in supply and demand may be prevented. Employers are already concerned about difficulties in hiring in some of these fields, and there are signs that health care providers are beginning to search for ways of accommodating new realities. Because some of the accommodations are expensive and difficult to accomplish, the committee is concerned that inaction may cause crises that could be avoided—health care services could be disrupted because providers of care are not available.

For some other fields, such as clinical laboratory technology and dental hygiene, there are factors that could cause instability in both supply and demand. For these fields the market is more likely to make the needed adjustments and serious disruptions are less likely to occur. However, in both of these fields there are unresolved issues concerning the level of personnel that will be allowed to perform certain jobs. The way these issues are resolved could determine whether major imbalances will occur.

Supply and demand for speech-language pathologists, audiologists, respiratory therapists, and dietitians are expected to be sufficiently well balanced for the labor market to make smooth adjustments. The kinds of incremental adjustments that make careers attractive and the ways in which personnel are deployed appear likely to maintain a state of equilibrium over time. Nevertheless, for these and other allied health occupations, changes in many factors could cause disequilibrium. These factors include: health care financing policies, technology change, decisions about education programs and regulatory policies. Those concerned with respiratory therapy, for example, must closely monitor an educational capacity that has proved volatile, as well as changes in home care reimbursement policy.

Our conclusions about the future outlook refer to the long term and they are national in scope. For all fields there are likely to be periods of greater and lesser imbalance between now and the year 2000, as well as local variation. The objective of policy is to make less painful and costly the process of adjustment. A decline in quality of care, interruption or reductions of service, and curtailment of investment in new technologies and organizational forms (such as home or outpatient care) that might improve the efficiency of health care delivery are all possible byproducts of personnel shortages. The decision to intervene in the labor market is made through the political process and reflects society's willingness—or lack of willingness—to tolerate painful dislocations. In many industries such dislocations are viewed as normal and acceptable. Public policy actions have demonstrated that health care is viewed differently. The committee investigated how educators, employers, regulators, and government can facilitate smooth working of the market.

Education

The function of the education sector in determining the size and composition of the workforce is clear. Unless educators, in league with employers and professional associations, are successful at fostering an interest in allied health careers among qualified prospective students, both the programs and the allied health workforce will weaken.

Demographic studies show that the United States population 18 to 23 years old has been declining since the beginning of this decade and will continue to decline through the mid 1990s. Shrinkage of the college age population will make it increasingly difficult for allied health programs to attract qualified applicants. In addition, other attractive opportunities compete for that population's attention. This suggests that greater attention will have to be paid to maintaining allied health's share of the traditional pool of students, and that less traditional sources of students (such as minorities, older persons, and career changers) should be tapped.

Academic allied health programs must overcome the perception, and to some extent the reality, that they are excessively costly and that their faculty do not make a sufficient scholarly contribution to their institutions. Modest but strategic actions by the federal government can help programs deal with these problems and compete more effectively for academia's limited resources. The committee recommends federal actions that would provide a signal to others who carry most of the responsibility — states, education administrators, and employers — that these programs must not be undervalued.

Problems of allied health educators can be analyzed in terms of recruitment of students, financing of programs, and the supply of qualified faculty.

Faced with increased competition for students, education institutions must become creative in their approaches to recruitment. Alliances with organizations also interested in recruiting allied health personnel must be forged. The committee therefore recommends:

Education institutions in close collaboration with employers and professional associations must organize for recruitment of students. Students should be sought in less traditional applicant pools — minorities, older students, career changers, those already employed in health care, men in fields where they are underrepresented, and individuals with handicapping conditions.

One way to create access to a larger pool of students is to allow entry into education through multiple routes.

Alternate pathways to entry-level practice should be encouraged when feasible. State higher education coordinating authorities and legislative committees should insist that education institutions facilitate mobility between community college and baccalaureate programs.

Recruitment of minority students is a particular concern for several reasons — minorities represent a relatively untapped source of manpower, their representation in the population as a whole is increasing, and minority professionals are more likely to serve underserved populations.

There have been a number of attempts to recruit and retain minorities in health professions. The lessons from successful models suggest that interventions must occur early in a student's life and continue through the academic career. The major source of support from the federal government has come from the Health Careers Opportunity Program.

The committee recommends:

Minority recruitment efforts must begin before high school. Academic institutions must offer academic support services for retention and seek to promote educational mobility. To succeed in the long run, these efforts must be made integral to the mission of education institutions.

The committee endorses the objectives of the Health Careers Opportunity Program (HCOP) and believes that funding levels must at least be maintained at current levels.

Allied health programs are vulnerable to closure because they appear to lag behind other programs in contributing to the academic standing and financial health of the institution. The committee made a number of recommendations directed to several aspects of this problem.

The overall strategy is to put allied health programs on a more equal footing with other academic programs.

In order to enhance the stability of allied health education, national organizations such as the American Society of Allied Health Professions should investigate models in which academic institutions have succeeded in broadening their financial base through such mechanisms as faculty practice plans, extension courses, and industry relationships. Those national organizations should also hold workshops to help institutions implement the models and to disseminate information.

Until credible alternative approaches are developed, the federal government and other third-party payers should maintain current reimbursement levels and mechanisms of support for clinical education.

The committee found that in some fields shortages were inhibiting expansion of education capacity despite strong student and employer demand. More generally there is a perception that faculty are becoming dissassociated from clinical practice to the detriment of students' preparation for the workplace. This is in part due to the academic reward system which does not value patient care highly. Attention to faculty skills, however, should not be at the expense of progress in solidifying the research underpinnings that guide everyday practice.

The federal government and states should fund faculty development grants in allied health fields especially when faculty availability and lack of clinical expertise inhibit the production of entry-level workers.

A cadre of researchers and academic leaders is needed to advance the scientific base of allied health practice. To accomplish this, institutions with strong research commitments should consider developing programs that identify and nurture talented individuals. The committee recommends a federal research fellowship program to support these activities.

Private foundations should support centers for allied health studies and policy. These university-based centers will provide a critical mass of researchers and resources to advance technology assessment, health services research, and human resources utilization.

Institutions offering allied health academic programs should reward and encourage faculty clinical competence. Clinical practice that sustains this competence should be made a requirement and criterion for promotion.

Health Care Institutions

Health care employers directly generate demand for allied health workers and indirectly affect supply by the conditions of employment that they offer.

The committee reviewed the available literature to determine the sorts of activities that employers could undertake to enhance the supply of allied health workers by making a career in an allied health field more attractive to people choosing an occupation, and by increasing retention rates. Few studies of allied health were found. Most relevant work is from nursing, where intermittent shortages have focused interest on what it takes to reduce nurse turnover. The literature makes it clear that employers are able to affect entrance and exit rates. Even a small increase in tenure has a significant impact on the size of the workforce.

The committee recommends:

Employers should strive to increase the supply of allied health practitioners by attracting people into allied health and prolonging their attachment to their fields. Some ways include increasing compensation, and developing mechanisms for retention. Employers also should look to new labor pools that include men, minorities, career changers, and individuals with handicapping conditions.

Despite the reluctance of employers to raise pay in a cost-contained environment, if shortages occur compensation will increase as administrators are compelled to try to attract new entrants into allied health professions. This will make allied health personnel a more costly resource.

The committee found little evidence of the strategic planning and research that could help employers effectively use allied health practitioners and at the same time preserve quality of care, working within regulatory constraints and avoiding the professional resistance. Nowhere is there a substantial body of research to improve the effectiveness of allied health practitioners' activities.

Available data indicate that in many allied health occupations entry-level pay is currently competitive with other comparable occupations, but allied health salaries over the life of a career are so compressed that there is no incentive to remain in the occupation. Effective use of manpower will necessitate compensation incentives to increase tenure, and work organized in a way that uses the greater experience of the more expensive members of the workforce.

The committee recommends:

Health care providers and administrators should seek innovative ways to channel limited allied health resources to activities of proven benefit to consumers. Agencies such as the National Center for Health Services Research and the Health Care Financing Administration should sponsor research and technology assessment to ensure that allied health services are both effective and organized efficiently. Associations of employers, unions, accrediting agencies, and professional associations, should assist in disseminating research findings and providing technical assistance in implementation.

Health care managers will not succeed if they are alone in these efforts. The educators and professional associations, who provide the basis for practitioners' goals and aspirations as well as technical knowledge and skills, must also participate. Educators, employers, and professional associations must engage in a regular interchange and experimentation.

Chief executive officers, human resource directors, and other health care administrators must develop methods for effective utilization of the existing supply of allied health personnel. Such methods must grow out of experimentation with new ways of efficiently organizing the work and the distribution of labor among skill levels, always ensuring that quality of care is not compromised.

Employers and educators must forge a relationship to ensure that graduates are not frustrated by unrealistic expectations about what their work will entail and employers do not ignore the needs for career paths and professional stimulation. To be successful this effort requires that employers and educators try to understand each others concerns, constraints, and the pressures exerted by a changing evnironment.

Health care managers and academic administrators must engage in constructive exchanges to improve the congruence of employment and education. These exchanges, which should take place at the state and local levels, will be enhanced by the participation of educators who are also leaders of the professional associations.

To facilitate this interaction, the committee recommends that state legislatures establish special bodies whose primary purpose would be to address state and local issues in the education and employment of allied health personnel.

Licensure, Certification, and Accreditation

The committee took a broad view of the charge from Congress and examined the full array of regulation of allied health personnel, including state licensure of individuals and health facilities, certification of individuals by private organizations, the imposition of standards by third-party payers, and voluntary accreditation of education programs.

Collectively, these regulatory measures affect the size and characteristics of the allied health workforce. They affect the functioning of the labor market for allied health workers by defining who may enter the various fields, by determining who has what degree of control over health care services and dollars, and by constraining the range of staffing options available to employers. They provide identity and legitimacy to newly emerging occupations and their members.

Occupational licensure is of particular concern to the committee on several grounds. As the most restrictive type of regulation, it grants exclusive control over some health services to one type of worker. The committee concluded that licensure is costly and cumbersome and that its effectiveness in protecting the public is far from demonstrated. The efforts in a number of states to reform the regulatory process are encouraging, particularly the evolution of "sunrise" criteria for evaluating the need to regulate new occupations, which the committee endorses. Increasing the participation of the public in the regulatory process also is a positive development. The committee recommends that states should strengthen the accountability and broaden the public base of their regulatory statutes and procedures. In the near term, the committee suggests:

Licensing boards should draw at least half of their membership from outside the licensed occupation; members should be drawn from the public as well as a variety of areas of expertise such as health administration, economics, consumer affairs, education, and health services research.

Flexibility in licensure statutes should be maintained to the greatest extent possible without undue risk of harm to the public. This may mean, for instance, allowing multiple paths to licensure or overlapping scopes of practice for some licensed occupations.

In light of concerns about the future availability of adequate numbers of allied health personnel, and in light of the rapid changes in health care delivery, licensure appears to be inconsistent with the flexibility that will be needed. The committee believes that states should try to find alternatives to licensure. Professional groups should work toward strong title certification, devoting their efforts to convincing the public and the industry of the credential's value, as certified public accountants have done in their sphere.

The committee recommends statutory certification for fields in which the state determines there is a need for regulation, because this form of regulation offers most of the benefits of licensure but fewer of its costs. Medicare and other third-party payers should accept state title certification as a prerequisite for reimbursement eligibility. Such certification can and should be based on examinations and other eligibility criteria the states establish.

The committee was concerned that jurisdictional struggles among health occupations over scopes of practice and over referral and supervision requirements are conducted without a body of research literature or the informed judgments of knowledgeable, disinterested parties to guide those decisions. Absent such information, there is considerable risk that decisions will be made on purely political and economic grounds. It was the committee's view that the federal government should take an active part in developing the necessary evidence for use by the authorities responsible for these decisions.

The Bureau of Health Professions (or other future focal points for allied health personnel in DHHS) should sponsor a body with members drawn from allied health, other health professions, and from the health and social science research communities to assess objectively the evidence bearing on "turf" issues. This body, in consultation with other experts and interested parties, should consider issues of risk, cost, quality, and access. It should draw upon available scientific evidence and identify topics on which research is needed.

Long-term Care

The committee chose to devote special attention to long-term care for a number of reasons. The aging of the population and the need for long-term care for the elderly is a major force in future demand for allied health services. Despite broad concern about the needs of the elderly there is no certainty that the current financing systems enable providers to satisfy those needs. Further, because long-term care requires both therapeutic and social support services, it affords an opportunity to examine issues surrounding the interaction of allied health practitioners with other professions such as nurses as well as with workers having relatively minimal formal education — an important group of workers on which the committee wished to focus attention.

Allied health practitioners relate differently to their clients and to other health care providers in each of the three long-term settings studied — nursing homes, home care, and rehabilitation facilities. In nursing homes, minimally trained nurse aides are often the primary caretakers with the most frequent patient contact. Recent congressional and Health Care Financing Administration's actions to increase aide training is a step in the right direction. But, in the future, aides will require a higher level of training to link them more effectively to nursing and allied health personnel in the delivery of hands-on care.

In recognition that the greatest amount of direct patient contact and care in long-term care settings and programs is provided by personnel at the aide level, the federal government and other responsible governmental agencies should require education and training to raise the knowledge and skills of these personnel. Demonstration projects should be funded to encourage joint efforts by educators and employers in creating career paths for aides.

Some types of organizations that provide long-term care, such as home health agencies and nursing homes, must coordinate a wide array of services needed by fragile clients with multiple disorders. Mishandled, this can result in fragmented care, sometimes duplicative efforts, and often less than optimal use of each service. Collaborative team work by the care providers would improve the quality of care by helping team members to better understand each other's roles, ensuring appropriate, coordinated care, and might even reduce staff turnover by increasing the involvement in the job of each team member.

The committee, therefore, recommends that because the problems associated with chronic illness do not fall within the boundaries of any single discipline, administrators and care coordinators in long-term care settings should develop effective means for ensuring that all personnel involved in patient care work closely together to meet patient needs.

More generally, allied health workers in all long-term care settings need special preparation to take care of patients with chronic illness, to understand the psychological aspects of aging, and to confront disability, death, and dying. Therefore, the committee recommends that all allied health education and training programs include substantive content and practical clinical experience in the care of the chronically ill and aged.

Collaborative Action

Taken as a whole, the committee's recommendations are designed not merely to advance the role of allied health occupations, but also to preserve the ability of the health care system to confront the problems of the next decade. In drafting its recommendations the committee was cognizant that no one entity in the public or private sector now has the power or responsibility to determine whether allied health education and practice will adequately respond to the challenge of changing patterns of illness and care requirements. Ultimately, collaborative action will be required. None of our recommendations is self-implementing. Each requires a principal party to convince others to join in their efforts or to accede to alterations in traditional ways of operating, whether in educating students, delivering services or supporting professional interests.

CHAPTER 1
WHAT IS ALLIED HEALTH?

A computerized search of the nation's newspapers for the month of October 1987, found the term "allied health" cited in two stories. At the same time, there were 443 references to nursing and over 500 to physicians. The individual fields that normally fall under the heading of allied health fared only somewhat better. Physical therapists were mentioned in 21 articles, occupational therapists in 8, medical technologists in 3, and dental hygienists in 7. The scarcity of such references reflects a lack of public awareness of what allied health practitioners do, and the fact that the term has little or no meaning to the public at large. Even in the health care community there is considerable confusion about which fields constitute allied health. Many people who deliver allied health services or who educate its practitioners have long been dissatified with the term. But this has neither lead to a replacement nor a commonly accepted definition. The only consensus is a distaste for the predecessor term "paramedical." Appendix III provides a sample listing of job titles and allied health fields that might be included in the broadest definitions of allied health.

Supported by a grant from the W. K. Kellogg Foundation to the American Society of Allied Health Professionals (ASAHP) in the late 1970s, a National Commission on Allied Health Education tried to formulate a consensus definition. The commission's struggle with the concept is reflected in its definition that follows a six-page discussion: ". . . all health personnel working toward the common goal of providing the best possible service in patient care and health promotion." (National Commission on Allied Health Education, 1980). This definition does not draw boundaries that exclude groups of health care providers, nor does it describe commonalities of task or education that define the fields to be included. Rather, the commission chose to focus thematically on "alliances that need to be built" and "the collaborative approach to providing health services" as part of a team—an approach that has value when the purpose is to bind together a disparate group of practitioners.

The definition offered by the Committee on Allied Health Education and Accreditation (CAHEA), a body that accredits nearly 3,000 education programs, suggests the sensitivities involved in the designation of the fields that constitute allied health. CAHEA defines allied health practitioners as,

> . . . a large cluster of health care related professions and personnel whose functions include assisting, facilitating, or complementing the work of physicians and other specialists in the health care system, and who choose to be identified as allied health personnel.

> Definitions of allied health vary due to its changing nature and to the differing perspectives of those who attempt its definition and because certain medically related but traditionally parallel or independent occupations prefer identities independent of allied health: nursing, podiatry, pharmacy, clinical psychology, etc. Other occupations may or may not regard themselves as allied health, depending upon their varying circumstances, e.g., nutritionists, speech-language pathologists, audiologists, public health specialists, licensed practical nurses, medical research assistants, etc. (CAHEA, 1987)

CAHEA's discussion emphasizes that there are two approaches to defining allied health: the first describes groups or characteristics of groups that fall within certain ill-defined boundaries; the second relies on excluding groups.

In its 1979 Report on Allied Health Personnel the federal government adopted the latter view. It attempted to winnow from 3.5 million workers those in fields that came under the federal purview as allied health. The criteria excluded those (a) treated separately by legislation other than the allied health authorization; (b) having general rather than health specific expertise applicable to other industries; and (c) performing functions that require little or no formal training in health subject matter.

Thus, in addition to physicians, nurses, dentists, optometrists, podiatrists, pharmacists, veterinarians, and other independent health practitioners, the authors of the report excluded:

- professional public health personnel;
- biomedical research personnel;
- natural and social scientists working in the health field;
- nursing auxiliaries; and
- occupations requiring no formal training (U.S. Department of Health, Education, and Welfare, 1979).

Despite the continuing debate about definition and boundaries, some groups of practitioners have come together and unequivocally call themselves allied health personnel. The federal programs that supported allied health education provided the impetus for aggregation of these groups, such as occupational therapists, clinical laboratory technologists, and dental hygienists. They coalesced in academic institutions under schools of allied health to benefit from multidisciplinary interaction and educational efficiency, in health services settings for reasons of personnel administration, and in the professional associations to attempt to influence policy, collect information, and publish scholarly papers on issues of interest across the fields.

This coalescing is by no means complete; there are many academic programs outside allied health schools, health facilities that do not operationally recognize allied health as a useful grouping of occupational categories, and strong allied health professional associations acting independently of each other in the policy arena. However, the reasons for the diverse groups to come together under an umbrella title remain valid.

The committee chose not to engage itself in the search for a definition. The benefits of making the term precise are less clear than the benefits of continued evolution. The changing nature of health care makes some practices and practitioners obsolete while opening up opportunities for the formation of new groups. It is more important that pragmatism continue to prevail, that old and new groups draw what benefits they can from belonging to "allied health," than that accurate description of common characteristics define the group.

Lacking a satisfying definition of allied health, many groups have tried to impose order with a variety of classification schemes. One study classified practitioners according to their departmental affiliation and suggested the use of categories such as dental, dietary, emergency, diagnostic, therapeutic, and vision care services. Another study emphasized some crosscutting features across types of work. It recommended classification according to patient-oriented, laboratory-oriented, administration-oriented, and community-oriented groupings (National Advisory Health Council, 1967). A poll of professional associations arrived at three "clusters" according to job function: primary care workers (including medical, dental and nursing personnel); health promotion, rehabilitation, and administration personnel; and test-oriented workers. (National Commission on Allied Health Education, 1980) Clearly there is no "correct" taxonomy; different classification schemes emphasize different aspects of allied health jobs and personnel. The different emphases can be used to serve different purposes. Rather than rely on a single definition or scheme throughout the study, the committee prefers to emphasize the following characteristics of allied health fields. Each highlights important policy-related characteristics and helps to explain how the fields are differently affected by changes in the health care environment.

1. Level of autonomy Some fields have a history of practice without direct supervision, while others are struggling for a measure of independence. Many can work only as employees in supervised settings. Practitioners who can attract their own patients can reap the financial rewards of the public's interest in and willingness to pay for their services. Unless health care payers are willing to reimburse allied health practitioners for their services, and unless the practitioners are free of regulation that requires on-site supervision of a physician, independent autonomous practice is not possible

2. Dependence on technology In a health care system that frequently adopts new machines or techniques, individuals who work with only one machine may lose their jobs as new technologies arise. Those who become broadly involved in one or more technologies are less vulnerable to obsolescence Those involved with technological innovations that are coming into widespread use should benefit from strong demand for their services.

3. Substitutability Occupations vary on whether their "turf" is well-marked and protected. If workers from two occupations or two levels of the same occupation can perform the same functions, the workers who are paid more or who are more specialized may be displaced. If more highly trained workers are willing to work for the same wage as those with less education the lower-level practitioner may be displaced. For employers, the ability to substitute one type or level of personnel with another may be helpful when the supply of one type is tight.

4. Flexibility in location of employment Those who can work in a variety of settings are less vulnerable in a job market that responds to altered financing incentives by shifting the location of care, and contracting the amount of care provided in some settings.

5. Degree of regulation If a field is highly regulated (licensed by the state, titles protected by certification, or required to register with a government agency) employers are constrained from hiring anyone but workers from that field to perform a function. These workers are protected from substitution by other personnel. The supply of workers is likely to decrease if the requirements for entry into the field are augmented.

6. Inclusion in accreditation or certification standards In order to receive accreditation or certification, a health care facility may be required to employ practitioners in certain fields. If so, demand for these workers will respond to changes in the number of these facilities.

Throughout the study, a major challenge for the committee was to both capture the diversity of allied health occupations and to devise specific yet encompassing recommendations for those who must make policy decisions affecting the practitioners' role in the health care system. Toward this end, the committee chose to focus on 10 allied health fields. It used the following criteria in selectng the fields: each of the 10 should be large and well-known; collectively they should span the spectrum of autonomy; and collectively they should include practitioners who work in a wide variety of health care settings. Where suitable, however, the report will draw upon information about other allied health occupations that was provided to the committee.

The fields selected were clinical laboratory technology, dental hygiene, dietetic services, emergency medical services, medical record services, occupational therapy, physical therapy, radiologic technology, respiratory therapy, and speech-language pathology and audiology.

The final chapter of this report includes an examination of the role of nursing aides in long-term care. Nursing aides are not often included in definitions of allied health personnel, but are highlighted here because of the crucial role they play in patient care in many long-term care facilities, and because the centrality of their role makes their relationship with allied health personnel very important.

The discussion of aides in the final chapter also helps bring attention to some groups that are less discussed in the remainder of the report than the committee would like. These are the lower-level personnel, often called technicians or aides. These practitioners are frequently on-the-job trained, educated in short vocational programs or in one-year certificate programs. Because analysis of the present and future supply of practitioners depends heavily on data from education institutions, and these are not available for lower-level personnel, the committee was unable to make the same assessment for these groups as for some other allied health groups. Moreover, the jobs and tasks of lower-level personnel are not generally clearly delineated, and even their job titles can be confusing. The committee was therefore unable to evaluate trends in demand or the forces that determine the supply and demand for lower-level practitioners.

Observations made by a commission assembled by the American Dietetic Association (American Dietitic Association, 1985) to examine their profession help explain why study of lower-level personnel is difficult. During World War II, high school vocational programs, adult education programs, and hospital education programs began to train dietetic support personnel called food service supervisors. To this array of training sites was added correspondence courses developed by the American Dietetic

Association (ADA) in the late 1950s. When it became apparent that a more highly-educated support person was needed, the dietetic technician was created and trained in food service management, nutrition care or as generalists. Thereupon the food supervisor title was changed to dietetic assistant. Although in 1972 ADA published program essentials for both categories and began formal review and approval of education programs, in the same year a study commission found a need to define the tasks of the two fields. A decade later an attempt to determine the numbers of dietetic support personnel failed. Many problems were found. For example, workers identified as dietetic technicians were graduates of dietetic assistant or other programs. At the same time, the title "dietetic assistant" was deemed inappropriate because these practitioners often did not assist, but managed. In 1983, their title was changed to dietary manager. In the same year, partly because they could no longer differentiate the roles of the two types of support personnel, the ADA withdrew from the program of approval of dietetic assistants education. A membership association of dietetic technicians and assistants took over this function and the ADA is concerned lest the dietary managers become isolated from the rest of the dietary field.

In sum, dietary support personnel are both formally and informally trained, their roles are ill-defined, and their titles are in a constant state of evolution. Moreover, the ADA also notes that dieticians often use support personnel for clerical rather than dietary tasks.

The committee is aware that aides, technicians, and assistants play an important, if sometimes ill-defined, role in the nation's heath care system. By focusing on nursing aides in the final chapter of this report it hopes to give the reader an impression of the vital nature of the work of this group.

This chapter briefly introduces each of the 10 allied health fields covered in the report and outlines their evolution.[1] The development of two fields—perfusion and cardiovascular technology—is traced to see if developing fields tend to follow the same general pathways of established occupations. Appendix IV offers the committee's best estimates of the current numbers in each of the 10 fields.

Clinical Laboratory Technology

Clinical laboratory personnel perform a wide array of tests used to aid physicians in preventing, detecting, diagnosing, and treating diseases. The generalist medical technologist is the most widely recognized practitioner in this field and the one focused on in this report, but there are many specialties within the field including blood bank technology (the preparation of blood for transfusion), cytotechnology (the study of body cells), hematology (the study of blood cells), histology (the study of human tissues), microbiology (the study of microorganisms), and clinical chemistry (the analysis of body fluids).

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[1] The description of the allied health fields was drawn in large part from a paper prepared for the committee by Edmund J. McTernan. A list of historical source material is contained in appendix VIII.

Practitioners fall into two broad categories: baccalaureate-prepared technologists and associate degree- and certificate-prepared technicians. Technicians perform routine tests under the supervision or direction of pathologists or other physicians, scientists, or experienced medical technologists. Associate degree-prepared technicians may discriminate between similar items, correct errors by use of preset strategies, and monitor quality control programs within predetermined parameters. Technologists perform complex analyses, make fine line discriminations and correct errors. They are able to recognize interdependency of tests and have knowledge of physiological conditions affecting test results in order to confirm those results and develop data useful to a physician in determining the presence, extent, and, as far as possible, the cause of disease (CAHEA, 1987)

In the United States, the first clinical laboratory was established in 1875 at the University of Michigan. Soon thereafter, laboratories were established at other hospitals. Physicians specializing in pathology were responsible for these laboratories, but since the work was often routine, they soon hired non-physician assistants. By 1900, there were approximately 100 technicians in laboratories around the country. Demand for laboratory personnel greatly increased with the expansion of the health care system during World War I. By 1920, there were 3,500 laboratory technicians in the United States, half of whom were female. A census taken two years later revealed that 3,035 hospitals had established clinical laboratories.

All early technicians were trained for their laboratory role by the pathologists for whom they worked. In 1922 a training program was established at the University of Minnesota. Today a bachelor's degree with a major in medical technology, biology, or chemistry is the standard prerequisite for an entry-level job as a technologist. Medical technology programs (offered by colleges, universities, and hospitals) are based on considerable course work in the physical sciences and mathematics—often closely resembling the pre-medical curriculum—and at least a year of clinical training. Hospital programs are usually affiliated with universities which grant the academic degree. Technologists can also become recognized as such through a federal certifying exam. In 1972, the federal government established its own testing program to certify laboratory workers and make them eligible to provide reimbursable services in Medicare and Medicaid programs. Successful candidates are recognized for Medicare and Medicaid purposes as clinical laboratory technologists. Medical technicians may be graduates of two-year programs in community or junior colleges or of senior colleges that offer associate degrees, or graduates of a one-year certificate program sponsored by a hospital or vocational school.

Five states require that medical technologists or technicians be licensed. Other states require registration. Although professional association certification is voluntary, it is frequently a prerequisite for clinical laboratory jobs, and often necessary for professional advancement. Agencies that certify personnel include the Board of Registry of the American Society of Clinical Pathologists, the American Medical Technologists, and the National Certification Agency for Medical Laboratory Personnel.

Concerns over the quality of laboratory testing have surfaced recently. A number of approaches to addressing these concerns were suggested to the committee during its public hearing. One approach proposed by some leaders of the field is the introduction of licensure to assure that laboratory personnel have received requisite training. They also support efforts to define the scope of practice for each level of personnel. Others in the field do not believe that licensure assures quality nor do they wish to see educational credentials be the primary tool for differentiating competencies.

According to the American Society of Clinical Pathologists, 172,214 technologists and 37,271 technicians were registered as of February 1987. The BLS estimates approximately 239,000 jobs existed in 1986, of which 63 percent were in hospitals. It should be kept in mind that not all people doing the work described as that of a clinical laboratory technologist or technician are certified. People with expertise in a science field, as well as persons without a health-related or science-based education, are hired and given on-the-job training to perform clinical laboratory funtions. This is particularly true in settings that are not regulated by the federal government—physician office laboratories, for example.

Clinical laboratory technologists and technicians are most often women; only about 25 percent of the workforce are men. The more highly trained practitioners, graduates of four-year colleges, are a little older than the graduates of two-year colleges. Of the group of four-year college graduates, 37 percent are under 35 years old; 53 percent of the two-year college graduate group fall into that age bracket (Bureau of Health Professions, 1984).

Dental Hygienists

Dental hygienists, working under the supervision of dentists, remove stains and deposits from patients' teeth, take and develop x-ray films, apply fluoride, and make impressions of teeth for study models. They also instruct patients in oral hygiene. In states with less restrictive practice acts, dental hygienists have expanded functions including applying sealants to teeth, performing periodontal therapy, and administering local anasthesia. Most hygienists work in private dental offices; other employment sites include public health agencies, school systems, hospitals, and business firms. Hygienists should not be confused with dental assistants who work with the dentist, handing instruments, preparing for procedures, and other tasks that assist in the dentist's work.

In the middle of the 1800s, dentists first began expressing interest in prophylactic care as an adjunct to restorative dentistry. By the turn of the century, many had developed protocols for preventative care and were delivering it to their patients. However, these services were time-consuming for the dentist, hence, costly for the patient. In 1910, the Ohio College of Dental Surgery instituted a course for the training of the "Dental Nurse and Assistant." This one-year program graduated a single class before a coalition of Ohio dentists succeeded in closing it down.

Three years later, a Connecticut dentist, Dr. Alfred Fones, convinced his local school board to fund a program to train dental hygienists who would work in the school system giving prophylactic care to children. Fones envisioned dental hygienists working in private dental offices as well, but he placed great emphasis on the public schools.

The profession first gained legal status in Connecticut, which amended its dental practice act in 1915 to permit hygienists to practice under a dentist's supervision. The following year a court ruling in New York held that no existing New York law prevented dental hygienists from practicing. Subsequently, the American Dental Association (ADA) endorsed dental hygiene legislation, and, by 1951, hygienists were licensed throughout the United States.

It was not until 1947 that ADA and the American Dental Hygienists' Association (AHDA) developed the approved requirements for accrediation of dental hygiene programs. These requirements have been modified several times; to receive ADA approval today, a program must have both liberal arts and science content, and didactic and clinical instruction. Most programs grant an associate degree, but often require more than two academic years to complete. A lesser number take four years and culminate in a baccalaureate. Dental hygiene shares some of the ambivalence about education seen in the nursing profession: while four-year programs undoubtedly have more academic content, and presumably prepare graduates for additional career roles, there is only one level of dental hygiene license. All licensed hygienists, regardless of the degrees they hold, are permitted to perform the same range of dental services.

Of the issues facing dental hygiene today, autonomy is the most pressing. To start, licensure is effectively in the hands of dentists, not dental hygienists: in all states, hygienists are licensed by a licensing board that is composed primarily of dentists. At present, there is a strong movement within the profession to gain greater self-determination. One goal is to abolish state laws requiring that licensed hygienists work exclusively under dental supervision. And in Colorado, hygienists have won the right to practice independently. The ADA filed suit against the state demanding the reinstitution of the requirement that patients be referred to hygienists by licensed dentists. The suit was dismissed and the ADA is currently appealing that decision.

Dental hygienists are generally young women. Only one percent of the workforce is male, and only 10 percent is over 44 years old. In 1984 only 13 percent earned over $25,000 per year (American Dental Hyhienists' Association, 1987).

Dietetic Services

According to the American Dietetic Association (ADA) 1972 Study Commission, a dietician is a "translator of the science of nutrition into the skill of furnishing optimal nutrition to people." While all dietitians share a common interest in the science of food and its effect on the body, they work in many different roles—as administrators, educators, researchers, and clinicians. Some supervise large-scale meal planning at companies and school cafeterias, others assess hospitalized patients' nutritional needs and implement specialized diets, while still others advise individuals and groups on sound dietary practices. Dieticians are also involved in hyperalimentation, and the clinical frontiers of parental and enteral nutrition.

The term dietician was first coined at the 1899 Lake Placid Conference on Home Economics, but the roots of the profession extend back two decades earlier to cooking schools established in Boston, New York, and Philadelphia. One early practitioner, Sarah Tyson Rorer, held classes on nutrition for physicians and nurses before the turn of the century, and later edited a section of an American Medical Association (AMA) publication called "The Dietetic Gazette."

Like many other allied health professions, dietetics expanded during World War I. In England, of 2.5 million men screened for military service, 40% were found to be physically unfit, most for nutritional reasons. Good nutrition and food conservation for the public, and better health care for the troops, especially those sick and wounded, were of great concern both in the United States and England. Biomedical advances during that time also helped to stimulate the fledgling profession.

From its inception in 1918, ADA was active in accreditation, listing hospitals which offered reputable dietary internships. By 1927, the association had adopted a "Standard Course for Dieticians," the first of several steps toward ADA-sponsored accreditation of educational programs. In 1969, the association established a registry of dietitians. To qualify for registration today, one must have graduated from an accrdited college or university, completed certain course and experiential components, and must pass a national registration exam. In addition, dieticians must fulfill continuing education requirements in order to maintain certification. The term "nutritionist," previously reserved for people working in research, is gaining popularity with clinical practitioners. Adding the word "nutrition" to ADA's name has been proposed, but not approved by the membership. As of the summer of 1987, members continue to call themselves "dietitians."

Several issues are currently of major concern to dieticians. First, the profession is seeking to extend and strengthen state licensure. Currently, 14 states license dieticians, and a number of others are considering laws. Second, since there is a slow but steady trend toward private practice in the field, dieticians are interested in gaining third-party reimbursement for their services. Finally, the ADA is exploring how the field might be divided into sub-fields. Like several other allied health professions, the sum total of knowledge in the field has grown to the point where specialization seems inevitable. The many dieticians who today consider themselves to be specialists, have most often become so through concentration of their work in specific health care settings. Thus it is generally "on-the-job training" rather than formal education that makes them specialists. At present, an ADA committee is developing specialty boards, and defining specialty areas.

The best estimate of the size of the dietetics workforce comes from The American Dietetic Association which reported 44,570 active members at the end of 1987. The BLS estimates that approximately 40,000 dietician jobs existed in 1986 of which 37 percent were in hospitals.

The 1984 Study Commission on Dietetics described the "typical" ADA member as a young, college-educated, white female. A little more than 63 percent of ADA members were under 40 years old, 99 percent have a bachelor's degree, 97 percent are women and 87 percent are white (American Dietetic Association, 1985). Not much has changed since then. In 1986 less than one in ten ADA members was a man. Eighty six percent of technicians were white, compared to 88 percent of active dieticians. Sixty three percent of active dietician members were under 41 years old, while technicians were a little younger with 71 percent under 41. Forty percent of active dietician members have advanced degrees, and another 10 percent are working toward those degrees. For 70 percent of technicians the associate degree was the highest degree earned (Bryk, 1987).

Emergency Medical Services

Emergency medical technicians (EMTs), formerly called ambulance attendants, tend to people at the scene of emergencies, and transport them to hospitals or other health care institutions. EMTs (basic, intermediate, and paramedic) determine the nature and extent of victims' medical and trauma-related emergencies and provide limited care. Depending on their level of training and on state regulations, EMTs may provide such care as opening and maintaining airways, controling bleeding, immobilizing fractures, and administering certain drugs.

The first ambulance service was started during the Civil War in an effort to decrease mortality rates on the battlefield. By the late 1800s, several hospital-based ambulance services were operating in urban areas such as New York City and Cincinnati; smaller communities began introducing volunteer services in the mid-1940s. The main function of these early operations was transport. The personnel, often morticians and volunteers, were not trained in the delivery of emergency care.

The U.S. Department of Health, Education, and Welfare (DHEW) established an emergency medical services program in early 1960. The program was moved to the Department of Transportation (DOT) with the passage of the Highway Safety Act in 1966 which required states receiving federal highway construction funds to develop emergency services or lose 10 percent of those funds. The act recommended that ambulances be equipped with specific lifesaving equipment and managed by at least two people trained in emergency care.

A 1966 report by the National Research Council summarized practices and deficiencies at various levels of emergency care, and gave specific recommendations for a national effort to improve emergency services. The need for the development of the EMT as an allied health professional was first identified in this report. A common basic training course was the first step in increasing the professionalism of ambulance personnel. The most widely used training course was developed by DOT in 1969. In 1970, a National Registry of EMTs (NREMT) was organized to unify education, examinations, and certification of EMTs on a national level.

In September 1970, under a contract funded jointly by DHEW and DOT, the National Academy of Sciences Subcommittee on Ambulance Service developed guidelines for an advanced training program to train basic level EMT-As to become EMT-Paramedics (EMT-Ps). This was the beginning of the paramedic role in the EMS system. EMT-P's are qualified to carry out more advanced procedures under remote medical supervision, such as starting intravenous infusions, tracheal intubation, and defibrillation.

EMTs who did not fit into either of the two previously mentioned categories—more advanced than EMT-As but not as highly trained as EMT-Ps—were not recognized, although their numbers increased steadily. In 1980, the National Registry and the DOT determined the need to provide a standardized educational program and certification of EMT-Is and in 1981 began testing and providing certification for that category of emergency medical technicians. EMT-Is receive the basic EMT training plus portions of the EMT-P curriculum.

The 110-hour national basic training course is offered by police, fire, and health departments, and as a non-degree course in medical schools, colleges, and universities. Since 1982, paramedic training programs have been eligible for voluntary accreditation by CAHEA. All 50 states have some kind of certification procedure. In 24 states, registration with the National Registry is required at some or all levels of certification. Fifteen other states offer the choice of their own certification examination or the National Registry examination. All states require EMT-Ps to be certified by an agency of the state.

Career (paid) EMTs are employed by private ambulance services, hospitals, and municipal police and fire departments. Volunteer EMTs typically work for volunteer rescue squads and fire departments.

Emergency medical services continue to be dominated by volunteer personnel (although they are becoming increasingly difficult to recruit) who are not always able to devote time to attaining and maintaining the training for advanced certification. Volunteer EMTs are overwhelmingly EMT-As—basic trained technicians. The mix of levels varies by locality, however. In rural areas, for example, where the EMT workforce is typically composed of volunteers, any EMT-Ps are likely to be volunteers. On the other hand, in many urban localities, emergency medical services are entirely staffed by career personnel.

EMT-Ps are increasingly being used in hospital emergency departments to provide emergency medical service and to supplement nursing staff. EMT-As are sometimes hired, but typically in technical roles. Nursing groups in at least two states, Pennsylvania and Kansas, have formally protested the practice of EMTs performing nursing functions in emergency departments. Nursing leaders in Maryland have called for the development of a job description for emergency department EMTs.

Medical Record Services

Medical record personnel develop, implement, and manage medical information systems. They are responsible for keeping track of an institution's patients' records, compiling statistics required by federal and state agencies, and assisting the medical staff in evaluating patient care. In addition, medical record personnel work closely with the finance department to monitor spending patterns. Some medical record personnel code information, evaluate record completeness, and accuracy and enter information into computers. Three out of four jobs are located in hospitals; other major employment sites include HMOs, nursing homes, and group practices. Insurance, accounting, and law firms that specialize in health matters also employ medical record personnel, as do companies which develop and market medical record information systems.

The first medical record administrator, Grace Whiting Meyers, was appointed by Massachusetts General Hospital in 1897 to organize the patient care records which had been accumulating for 80 years. Other hospitals in the Boston area and elsewhere soon followed suit, hiring medical record personnel, then called "librarians." By 1912, a group had organized to share information and ideas. Four years later, the group adopted a name—the Club of Record Clerks. Over the next 50 years, this club evolved into a national organization, now called the American Medical Record Association (AMRA).

Official standards for training programs were not established by the American Association of Medical Record Librarians (AAMRL), AMRA's precursor, until 1934. In 1942, at the request of AAMRL, the American Medical Association assumed the responsibility of approving education programs for medical record personnel. The number of approved schools grew at a slow pace, however. To increase the pool of qualified persons in the field, and provide recognition to workers who could not qualify as registered librarians, standards for programs to train a lower level worker, the medical record technician, were promulgated in 1953.

At first, most programs for both librarians and technicians were hospital-based. But by the 1960s, the field's leaders were convinced professional record librarians needed a broad liberal arts education. By 1970, all approved programs for medical record librarians granted a baccalaureate degree and were based in colleges and universities. Programs for technicians also were shifted: today, technicians generally hold an associate degree from a junior college.

As health care institutions grew in size, the role of a medical record librarian evolved from that of a clerk to an information systems manager. The head of the medical record team often organizes a large-scale information service, trains and supervises a staff, and devises means of evaluating patient care. Reflecting this shift in responsibilities, the title of medical record librarian was changed to medical record administrator in 1970. Medical education record programs gradually have adopted course work in areas such as business management and data processing. In addition, administrators now may specialize; sub-fields include: quality assurance, information management, computerization of information, and tumor registry. To become a registered medical record administrator candidates must have graduated from an accredited baccalaureate program and pass a registry examination.

Because registration is voluntary and medical record departments use on-the-job trained personnel for some of the lower-level jobs, it is hard to know the size and composition of todays medical record workforce. AMRA reported 8,240 registered medical record administrators and 14,690 accredited record technicians in 1987. The BLS estimates that nearly 40,000 technician jobs existed in 1986. AMRA estimates that 98 percent of its membership are women, and approximately 95 percent are white (Finnegan, 1987).

Occupational Therapy

Occupational therapists direct their patients in activities designed to help them learn the skills necessary to perform daily tasks, diminish or correct pathology, and promote and maintain health. Therapists work in many different settings including rehabilitative and psychiatric hospitals, school systems, nursing homes, and home health agencies. The nature of their work varies according to the setting. Therapists working in mental hospitals, for instance, typically provide activities, which help mentally ill and retarded people learn to cope with daily stresses, as well as manage their work and leisure time more efficiently. In rehabilitative hospitals, therapists may introduce patients to equipment, such as wheelchairs and splints, or custom design special equipment; they may recommend changes in work or home environments to facilitate functioning. Because the field is so extensive, therapists tend to work with specific age groups or disabilities. The field can be most readily divided into those who work with mentally disabled people, and those who work with physically disabled people. Three out of five, work with people with physical disabilities; some work only with the elderly, others exclusively with children.

The roots of occupational therapy (OT) go back at least two hundred years to French physician Philippe Pinel who found that mental patients given menial tasks to perform improved more quickly than those patients who were idle. In the United States, physician Benjamin Rush also advocated work as a treatment for his mentally ill patients at Philadelphia's Pennsylvania Hospital. In 1906, the first training course for occupational therapists was established in Boston.

World War I spurred the growth of OT, and expanded its scope of practice to include physical as well as mental rehabilitation. Initially, four OT reconstruction aides were recruited for service in European-based American army hospitals. And in 1917, it was decided that 200 others were needed to "furnish forms of occupations to convalescents in long illnesses and to give the patients the therapeutic benefit of activity." Three crash programs were established which trained hundreds of OT aides by 1921.

The National Society for the Promotion of Occupational Therapy was established in 1917; three years later the association changed its name to that in use today, the American Occupational Therapy Association (AOTA). In 1923, the field received a major boost when the Federal Industrial Rehabilitation Act required that every general hospital treating victims of industrial accidents provide occupational therapy. Also that year, AOTA first established minimum standards for training programs: these called for a professional training program of 12-month duration open to high school graduates. Ten years later, AOTA and the American Medical Association began collaborating on accreditation for OT programs.

Since then, the field's body of knowledge has expanded considerably, and educational requirements have been strengthened. Today there are two levels of education—technical and professional, and there is no upward mobility through experience alone. Education programs are accredited by the Committee for Allied Health Education and Accreditation, an arm of the American Medical Association. Technical education programs grant an associate degree and prepare individuals to become credentialed as an occupational therapy assistant (COTA). Professional programs are offered at three levels, baccalaureate, post-baccalaureate certificate, and master's degree. All prepare a person to become credentialed as an occupational therapist (OTR). In addition, occupational therapists now specialize in one of several subfields: gerontology, developmental disabilities, training in activities of daily living, prosthetics training and construction of splints, and the rehabilitation of people with spinal cord injuries and neurological disorders.

As of 1987, 34 states plus the District of Columbia and Puerto Rico, have OT licensure laws. All laws specify that the AOTA certification exam be used as the licensing exam. Licensure also requires a degree or certificate from an accredited educational program.

Though the roots of occupational and physical therapy are similar, occupational therapists' autonomy has been slower to develop than physical therapists'. While reimbursement for OT inpatient services is covered by third-party payers, reimbursement for outpatient and in-home services, until recent changes in Medicare, has been more erratic. Still, a growing number of therapists are in private practice. Some work in consulting firms, or multispecialty group practices, while others are solo practitioners. Typically, patients are referred to them by physicians or other health professionals.

To leaders in the field, a major concern continues to be OT's difficulty in meeting demand for qualified practitioners. Demand has grown considerably over the past several decades, but leaders also attribute the shortage of practitioners to the field's failure to attract sufficient numbers of students. Many people's unwillingness to make their careers in psychiatric settings may be impeding recruitment. Also, laymen often confuse OT and PT, and the more visible and autonomous PT may be more attractive to potential students.

The best estimate of the size of the occupational therapy workforce is the American Occupational Therapy Association's list of registered active members, which numbered 27,300 at the end of 1987. Occupational therapists are most often women (95 percent) with a median age of 32. Most work full time (70 percent) and 20 percent are self-employed. The 12 percent who have masters' degrees have exceeded the minimum educational requirement. The mean income reported in 1986 was approximately $26,500 (AOTA, 1986).

In 1986 the AOTA counted 7,909 certified Occupational Therapy Assistants (COTAs) amongst its membership. Their characteristics were in some ways similar to the therapists. Their age and proportion that were women and worked full time were almost identical to therapists. However, the education and earnings differed. Seventy-four percent had associate degrees, 29 percent had diplomas or certificates, and their average earnings was $16,182 (AOTA, 1986).

Physical Therapy

Physical therapists plan and administer treatment to relieve pain, improve functional mobility, maintain cardiopulmonary function, and limit the disability of people suffering from a disabling injury or disease. Therapeutics include: exercises for improving endurance, strength, coordination and range of motion; electrical stimulation to activate paralyzed muscles; instruction in the use of assistive devices such as crutches, or canes; and massage and electrotherapy to alleviate pain and promote healing in soft tissues.

Physical therapists work in a variety of employment settings. In 1986, hospitals provided one-third of jobs. Other major employers are rehabilitation facilities, home health agencies, and nursing homes, HMOs, school systems, and clinics. In addition, almost 20 percent of therapists are in private practice. Some private practitioners work solo or with a group practice; others provide an institution, such as hospital or nursing home, with care on a contract basis.

Modern physical therapy was born during World War I when the country was suddenly faced with a need to rehabilitate large numbers of wounded soldiers. In 1917, the Surgeon General of the Army initiated an intensive, short-term program which trained 800 "reconstruction aides," all women, in physical therapy. Reconstruction aides were civilian employees of the U.S. Army Medical Corps and typically worked in army hospitals. As soldiers were discharged after the war, the need for reconstruction aides grew in the civilian sector. In addition, the army continued to employ aides to work with hospitalized veterans.

In 1920, the American Women's Physical Therapeutic Association was formed by reconstruction aides who had served in the war. Reconstruction aides were considered charter members. Others seeking to join the association were required to have graduated from "recognized schools of massage and therapeutic exercise with some knowledge of either electrotherapy or hydrotherapy." By the end of 1921, the new association had 245 members. This association became the current American Physical Therapy Association.

World War II brought a sudden increase in the demand for therapists to treat injured servicemen; a demand met largely through rapid establishment of federally funded, accelerated programs to prepare college graduates from fields such as physical education for practice as therapists. Often operated in parallel with existing four-year university degree or certificate programs, these accelerated programs were discontinued at the end of the war. However, the many graduates they supplied were generally regarded as highly competent, and this temporary system provided impressive evidence of the ability of educational programs to respond to a sudden change in manpower demand. During the 1940s and early 1950s a series of severe poliomyelitis epidemics created another rapid rise in demand for therapists. This time both demand and supply were strongly influenced by the private sector. Massive donations to the National Foundation for Infantile Paralysis (March of Dimes) were used to employ therapists, set up treatment centers, and subsidize therapy for a large number of patients. Concurrently the Foundation invested heavily in education of therapists by:

- underwriting salaries for many new faculty positions to permit
- existing schools to expand enrollments
- funding an intensive student recruitment and scholarship program that drew many new people into the field
- supporting development of graduate programs for faculty training.

The dramatic reduction in number of new polio patients following development of the Salk and Sabin vaccines in the early 1950s had only a brief effect on the demand for physical therapists. Growing interest in the vocational rehabilitation of young adults and the expansion of rehabilitation services to previously underserved groups of patients with a wide variety of movement disorders soon absorbed the manpower previously needed for care of acute polio patients.

Today, all states require practicing physical therapists be licensed; and applicants must hold a degree from an APTA-accredited program prior to taking the licensing exam. Since 1960, there have been three educational avenues to entry-level jobs as physical therapists: baccalaureate programs, certificate programs for people who already hold a bachelor's degree in another field, and two-year master's programs. In 1979, the APTA announced intentions to elevate the entry-level requirement to a master's degree—a mandate that encountered vigorous opposition, especially from the American Hospital Association, deans of allied health programs, and certain higher education associations. As a result, the mandate has been softened to encourage a general movement toward the master's degree.

In 1967, an assistant-level position was created so that physical therapists could delegate more routine tasks, and treat greater numbers of patients. At present, there are approximately 17,000 practicing physical therapy assistants.

Physical therapists have more autonomy than most allied health practitioners. Many are in private practice and the APTA directly accredits educational programs independent of CAHEA. Some states allow patients direct access to physical therapy services, which eases entry into independent practice for therapists. Thirty-eight states now permit the therapist to evaluate patients without medical referral; 11 of these also permit treatment of patients so evaluated. Legislation on direct access is pending in about a dozen other states.

As the scope of practice in physical therapy expanded to include services as diverse as pulmonary therapy for critically ill patients in intensive care units, developmental assessment of high risk newborn infants, home care for elderly stroke and arthritis patients, and industrial consulting to reduce low back injuries, specialization has become a feature of the careers of many therapists. In 1978 the American Physical Therapy Association established a Board for Certification of Advanced Clinical Competence which currently oversees the examination and certification of clinical specialists by Specialty Boards in six fields: cardiopulmonary, clinical electrophysiology, neurological, orthopaedic, pediatric, and sports physical therapy. Thirty universities now offer post-professional graduate programs for advanced professional study by experienced therapists. This included nine doctoral level programs.

APTA estimates that the number of licensed physical therapists in 1986 to have been close to 66,000. Physical therapists are most often women, with men constituting 25.4 percent of the workforce in 1987, a little down from 28.8 percent in 1978. Women therapists are on average a little younger than men (35 years old versus 38). The proportion of minority therapists remained between 4 and 5 percent in the past decade. The 15 percent of the workforce who worked full time for themselves were the highest earners, grossing nearly $73,000 on average in 1986 compared with approximately $32,000 for the 67 percent who were full-time salaried employees. The educational attainments of physical therapists have increased during the past ten years. The percentage with masters' degrees has increased from 15.2 percent to 21.5 percent since 1978, and the percentage with a doctoral degree increased slightly from 1.1 percent to 1.4 percent (APTA, 1987).

Radiologic Technology

Radiologic services began with the diagnostic use of x-rays and the applications of these and other types of ionizing radiation for therapeutic purposes. Originally provided almost exclusively by radiologists (physicians) and their technical assistants or x-ray technicians (now called radiographers), radiologic services have expanded considerably in recent decades. New professions have emerged with medical and technological advances. New applications of radioactive tracers led to the birth of nuclear medicine technology; the invention of therapeutic x-ray equipment for treating cancer resulted in the field of radiation therapy technology; and the development of ultrasound imaging systems have created a new category of radiologic personnel, the diagnostic medical sonographer.

Radiologic technologists and technicians (including radiographers, radiation therapy technologists, nuclear medicine technologists and diagnostic medical sonographers) held about 125,000 jobs in 1986. About two of every three jobs were located in hospitals. Other employment sites include clinics, laboratories, and doctors' offices.

Twenty-five years after the discovery of x-rays in 1895 by Wilhelm Roentgen, 13 x-ray technicians gathered in Chicago and formed the American Association of Radiological Technicians (now called the American Society of Radiologic Technologists). In 1920, a committee of physicians was appointed by the Radiological Society of North America to consider standards for the training of x-ray technicians. Two years later the American Registry of X-ray Technicians (now called the American Registry of Radiologic Technologists) was organized by the Radiological Society of North America and the American Roentgen Ray Society. The registry was controlled by physicians until 1961 when the composition of the registry board was changed to include technologists. Initially, all training in radiologic technology was done on the job. Gradually, however, hospitals organized schools for technicians, and a program composed of a year of classwork followed by a year of clinical training evolved. In 1933, the first three programs were recognized by the registry. Today, CAHEA accredits more than 1,000 formal training programs.

Radiologic technology education changed after World War II, partly as a result of the G.I. Bill. Large numbers of returning veterans were interested in careers in the expanding health care field, and, at the same time, wished to pursue formal education under the G.I. Bill. Many two-year college administrators, recognizing this new market, established two-year radiologic technology programs which granted an associate degree. This development came on the heals of a growing movement within the field to extend the duration of training programs.

At present, there are formal training programs in radiography, sonography, radiation therapy technology, and nuclear medicine technology. They range from one to four years and grant a certificate, an associate degree, or a baccalaureate. Two-year programs are the most common. Some one-year programs attract health care professionals who are interested in changing fields—most often, respiratory therapists, registered nurses, and medical technologists. Certificate programs also attract radiographers who want to specialize in ultrasound, radiation therapy, or nuclear medicine. At present, four-year programs are designed primarily for people interested in teaching or supervisory positions.

There appears to be a trend toward programs of longer duration based in institutions of higher education. Because some educators feel that advances in technology have made it difficult to adequately train students in two years, a number of associate degree programs are experimenting with a third year. Some leaders in the field feel that the slight difference between a three-year associate degree program and a four-year bachelor's program will push the field toward making the baccalaureate degree the educational standard for entry-level jobs.

As of summer 1987, only five states—New York, New Jersey, Florida, California, and Kentucky—had licensure laws for radiologic technologists. In 1984, Congress passed the Jennings Randolph Bill which requires that states either establish minimal educational standards for radiologic technologists, or adopt extant federal requirements, which call for voluntary compliance. Almost all states have opted for voluntary compliance.

The radiologic technology workforce is one of the largest among the allied health fields. The Bureau of Health Professions estimates that 143,000 radiologic health service workers existed in 1986 — of which approximately two-thirds were women and half were under 30 years old.

Respiratory Therapy

Respiratory therapists provide a range of services: from emergency care for stroke, drowning, heart failure, and shock, to providing temporary relief to patients with emphysema or asthma. They often treat patients who have undergone surgery, because anesthesia depresses breathing and respiratory therapy may be prescribed to prevent the development of respiratory illnesses. The majority of respiratory therapists work in hospital settings, although increasing numbers are employed by nursing facilities and home health agencies.

Since the 1800s, doctors have prescribed oxygen therapy for individuals with cardiopulmonary problems, and until recently the task of actually administering treatment fell to attending nurses. After World War II, however, much of the equipment for administering oxygen became so sophisticated and expensive that administrators began assigning respiratory care tasks to orderlies who became known as oxygen orderlies.

These first respiratory therapists, although usually employees of nursing departments, frequently developed direct relationships with physicians, and often came to know more about gas therapy than their immediate supervisors.

The field's first professional organization, the Inhalational Therapy Association was formed in Chicago in 1946. Now, several decades later, the organization is national in scope and is called the American Association for Respiratory Care (AARC).

As the field and its body of medical knowledge evolved, the range of tasks performed by respiratory therapists widened to include both the mundane and the highly complex. As a result, in the late 1960s leaders in the field promoted the idea of developing an entry-level position so that respiratory therapists could be relieved of the more routine tasks. In 1969, the first inhalation therapy technicians were certified.

Training is offered at the post-secondary level in colleges and universities, medical schools, trade schools, and hospitals. In order to be accredited by CAHEA, programs for respiratory therapists must be of at least two years duration and lead to an associate or baccalaureate degree. Technician programs usually last one year. Certification is voluntary and available through the National Board for Respiratory Care. As of June, 1987, respiratory care personnel were licensed in 18 states, and licensure bills had been introduced in 10 others.

At the present time, members of the field are concerned about issues relating to competition with other health care workers. They are alarmed by the incursions into the field by other health care workers, especially nurses, who in the early years performed the functions (or the precursors of the functions) usually handled by respiratory therapists today. To halt these incursions and protect the quality of respiratory services, therapists are seeking licensure in all 50 states. It should be noted that the AARC, unlike many other allied health organizations, is not currently striving to achieve greater independence from physicians for itsmembership. The leadership of the AARC anticipates that respiratory personnel will continue to work under the direction of physicians.

The Bureau of Labor Statistics estimates that over 56,000 respiratory therapy jobs existed in 1986, the majority of them in hospitals. AARC suggests that administrative positions are excluded in the BLS count. Two-thirds of respiratory therapists are under 30 years of age, and, unusual for an allied health field almost 40 percent are men.

Speech-Language Pathology and Audiology Services

Audiologists and speech-language pathologists held approximately 45,000 jobs in 1986. Just over half of these positions were in elementary and secondary schools, universities, and colleges. Hospitals, nursing homes, speech-language and hearing centers, and private physicians provide most the the remaining jobs. Unlike most other allied health professions, the speech-language-hearing profession does not function exclusively or even principally in the medical world. Moreover, the care provided by these professionals was not previously supplied by physicians. The development of these fields took place in the educational sector. Early in this century, educators became interested in introducing speech correction services into the public schools. The Chicago school system was first, hiring 10 speech correction teachers in 1910. Within 6 years, Detroit, Boston, New York, and San Francisco had followed Chicago's lead and also employed speech correctionists. University education of persons interested in speech correction was initiated in the United States around 1915 at the University of Wisconsin.

Most early speech correctionists saw themselves as specialized teachers of elocution and belonged to a large organization known as the National Association of Teachers of Speech (NATS). In 1925, a group of speech correctionists decided that forming a semi-autonomous organization under the auspices of NATS would best serve their professional interests and the American Academy of Speech Correction (AASC) was born. Among the goals of the fledgling organization was raising "existing standards of practice among workers in the field of speech correction," and securing "public recognition of the practice of speech correction as an organized profession."

During the next several years, the association grew, and along with it, dissatisfaction over its close connection with NATS. The traditional time of the annual NATS meeting apparently was not convenient for many AASC members, and many felt that AASC should be affiliated with groups in the medical world instead of NATS. After 25 years, complete separation from NATS was achieved; today the organization is known as the American Speech-Language-Hearing Association (ASHA).

A master degree in speech-language pathology or audiology is the basic credential in this profession, although there are numerous programs in communications sciences and disorders at the baccalaureate level. Of the approximately 235 colleges and universities offering master degree or doctoral programs in speech-language pathology and audiology, about two-thirds are accredited by ASHA. Coursework at accredited schools includes basic communication processes, study of speech-languagepathology and/or hearing disorders, and related areas such as the psychological aspects of communication. Most persons with a master degree acquire the Certificate of Clinical Competence (CCC) in either speech-language pathology or in audiology offered by ASHA. To earn the CCC, the individual must hold a master degree or its equivalent, complete a supervised clinical fellowship year, and pass ASHA's written exam.

Thirty-six states require that people offering speech-language pathology and audiology services hold licenses if they practice privately in clinics, or other non-school settings. Medicare, Medicaid, and other third-party payers pay for the services of licensed practitioners. In states that do not have licensure laws, Medicare and Medicaid require that speech-language pathologists and audiologists meet the educational and clinical experience requirements for the CCC or be in the process of accumulating the necessary clinical experience.

Increasing numbers of individuals within the field are engaging in independent private practices. This trend, while fairly new, is rapidly growing. Like leaders of other increasingly autonomous allied health professions, authorities in speech-language pathology and audiology are seeking to ensure that standards of practice remain high.

ASHA estimates that approximately 86,700 speech-language pathologists and audiologists are active in the workforce (Shewan, 1988). Approximately fifteen percent of practitioners certified by ASHA are audiologists and most the the remainder are speech-language pathologists; about 2 percent of speech-language-hearing practitioners are certified in both speech-language pathology and audiology (ASHA, 1988). In 1987 audiologists earned slightly more than speech-language pathologists. ASHA member audiologists' median annual salary in 1987 was $28,000 compared with $25,000 for speech-language pathologists (Guthrie, 1988). The speech-language pathology workforce is overwhelmingly white and female (approximately 95 and 89 percent respectively in 1988).

New Allied Health Fields

The committee recognizes that the 10 fields selected for this study represent established, traditional allied health professions. The changing pattern of health care delivery has tended to spawn new allied health fields—fields that may develop as changes in the health care system take place and as technology changes or expands. The committeee looked briefly at two fields that have recently come to be recognized as allied health occupations—perfusion and cardiovascular technology—to see if developing fields tend to follow the same general pathways of the established occupations. These two fields developed from a core they once shared with respiratory therapy. Early school programs covered heart and lung procedures; as technologies developed, practitioners specialized in one or another area and separate fields and occupations evolved.

Perfusion

Perfusionists started out in the mid-1950s as pump technicians for heart-lung machines—equipment devised to withdraw blood from a patient's body, cleanse and oxygenate the blood and pump it back into the body. These technicians moved with the equipment from the experimental laboratories into clinical settings as assistants to surgeons and anethesiologists. Trainees were often drawn from other disciplines, including nursing and respiratory therapy, and were trained on the job until the mid 1970s.

By the mid-1960s, perfusionists saw the need to develop a system for certifying practitioners and to establish a minimal base of knowledge for the profession. They formed the American Society of Extra-Corporeal Technology (AmSECT) to organize the profession and to provide information and professional services to its members, and in 1968 AmSECT began a program of certification for perfusionists. The American Board of Cardiovascular Perfusion was established in 1974 to conduct certification as an independent activity. In 1977, CAHEA recognized perfusion as an allied health profession and the way was paved for establishing accredited schools for training.

Any of the technicians trained on the job prior to the establishement of accredited training programs were able to sit for the certification exam, but since 1981 (when schools became available) no one may sit for the exam without having graduated from an accredited program.

Perfusionists work under the general supervision of a physician. Whereas they once worked only with heart-lung machines, perfusionists now manage highly technical patient monitoring devices in the operating room. They are no longer limited to heart bypass procedures but now also assist during organ transplant procedures. The profession is striving to expand its expertise and not limit its focus to one technology. It is expanding its scope to include managing patient monitoring devices that have not been claimed by another allied health field. Perfusion is taking a course not dissimilar to those of older, well-established allied health professions.

Cardiovascular Technology

The field of cardiovascular technology concerns the diagnosis and treatment of patients with cardiac and peripheral vascular disease and is segmented into three distinct areas: invasive carrdiology, noninvasive cardiology, and noninvasive peripheral vascular study. As each of the areas developed and as changing technology led to their divergence, technicians were trained in each area to conduct the requisite test and procedures. The three groups have remained together for the purpose of designing an education program. Since December 1981, cardiovascular technology has been recognized by CAHEA as an allied health profession. Cardiovascular technologists and technicians specialize in one or more of the three areas. Program accreditation criteria have been developed, but thus far there are no accredited programs for training cardiovascular technicians. Several programs are expected to be available by fall 1988.

The range of skills and training is broad. Within the area of noninvasive cardiology, for example, procedures range from electrocardiography (EKG), which may be taught in a few hours, to echocardiography, an ultrasound technique which requires relatively extensive training. EKG technicians are often cross-trained on the job in exercise testing—another non-invasive cardiology procedure.

The associations representing cardiovascular technicians who do EKGs and exercise tests have established a separate board to test technicians who want to be credentialed; the majority are not credentialed. Institutions encourage credentialing, but do not require it. These technicians are employed in a variety of settings including physicians' offices, out-patient clinics and exercise clinics. They work under the supervision of nursing staff or physicians.

The technicians that specialize in echocardiograms are often trained on the job. Only six of the 30 schools offering ultrasound training include training in echocardiography, and none are accredited under CAHEA's new essentials for cardiovascular technology. Training in these programs must generally be supplemented by on-the-job training, but not all health care facilities have the capability to train the echocardiography technicians they need. The demand for these technicians is high and their salaries are rising. They are often drawn from other disciplines, including nursing, physical therapy, and respiratory therapy; few trainees are without a medical background.

The Society of Diagnostic Medical Sonographers represents echocardiographers and other sonographers. There are two boards which provide testing for certification in the field. Generally, individuals need to have several years experience before qualifying to take the exam. The majority of echocardiographers are not board certified, but interest in certification is growing—more so than in any of the other cardiovascular technology areas. The American College of Cardiologists is encouraging certification through only one body, which will probably provide increased impetus for certification.

Although echocardiographers have some degree of autonomy, they work closely with the physician. Echocardiography overlaps with radiologic technology, which includes ultrasound technology or sonography. A movement to draft state legislation requiring that ultrasound operators be radiology technicians is being fought by non-radiology technicians who work with ultrasound technology.

Invasive cardiovascular technologists assist physicians in, as their title suggests, invasive heart procedures. With the development of bypass surgery the number of catheter labs rose and demand for technologists grew. Developments in baloon angioplasty and laser technology may have the same effect. Practitioners are generally drawn from other clinical areas, including x-ray technology and nursing, and are typically trained on the job.

Noninvasive peripheral vascular technologists assists in diagnostic studies of the the peripheral circulatory system. As in the case of echocardiography, ultrasound techniques are used in the diagnostic studies and substantial training is required, and like echocardiographers, noninvasive peripheral vascular technologists who conduct ultrasound tests face competition from radiologic technologists. Equipment manufacturers have been the primary source of training; they have established education programs in their own facilities as well as provide on-site, in-service training. In the early days, most trainees were nurses, but the field now draws persons from other disciplines.

Conclusion

Allied health practitioners are enormously diverse in terms of the work they do, the amount of education required, the types of institutions that offer the education, and the regulatory control of their activities. However, their evolution followed courses that are common to several if not all fields. The fields developed to meet identified health care needs, often taking over tasks that physicians no longer wanted to undertake. Initially on the job training was the norm, but soon the practitioners formed an organization, defined their roles and identified minimum qualifications that practitioners must possess.

Certification of practitioners and accreditation of education programs followed. Many allied health fields today use the Committee on Allied Health Education Accreditation (an arm of the American Medical Association) to accredit their programs.

Others have preferred to keep accreditation within the purview of the field. Many groups view this as one of the key attributes of a profession. Almost inevitably the educational requirements have increased and often licensure followed, which serves several purposes including protection of practitioner's educational investment. Often tensions developed between the practitioner's field and the medical or dental speciality from which the field developed. New professions have sought to control their own destinies. The originating professions have sometimes been reluctant to relinquish control. They fear competition from the very groups they initially encouraged in order to relieve themselves of unwanted tasks.

Some allied health fields, such as physical therapy made the transition from hospital training to baccalaureate education in universities and colleges in the first half of the century. With the community college movement in the 1960's, assistant-level programs developed to meet the growing demand for services and the need to make practitioners more productive. For other fields, the transition to academia was made much more slowly. Radiography and respiratory therapy are in the midst of evolving toward the baccalaureate degree, so that now we see some one year programs giving way, primarily to two year and baccalaureate programs. Those with higher degrees tend to gravitate toward administrative roles.

The spectrum of allied health today includes fields at different stages of evolution. This report represents a snapshot of them at one point in time.

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CHAPTER 2
APPROACHES TO DEMAND AND SUPPLY

Congress directed that this study "identify projected needs, availability, and requirements of various types of health care delivery systems for each type of allied health personnel." In order to respond to this charge, the committee had to resolve several issues of scope and approach.

Current versus future "needs, availability, and requirements" The committee believes that, given limited funds and time, its greater contribution is to provide its best assessment of future needs and requirements for allied health personnel and its best assessment of the kinds of adjustments that will be needed to meet those needs and requirements. Although recognizing that there is intense interest in the current situation, the committee believes that most of the study's resources would have been needed to make a systematic assessment of that situation, whereas the future outlook is more crucial to strategic planning and policy. Therefore most of the effort has gone into developing a picture of the future. To the extent that we became aware of perceptions of current imbalances as we conducted the study, we report those.

"Each type of allied health personnel" As the charge implied and the committee clearly recognized, it is neither feasible nor useful to consider needs and availability of allied health personnel collectively. Allied health comprises occupations with varying labor market characteristics such as paths of entry, levels and types of responsibilities, wages and salaries, labor force entries and exits, and work sites. As a consequence, the situation must be considered separately for each occupational field. The approach here has been to examine 10 allied health fields in some depth in order to illustrate the diversity among them. To the extent possible, these fields are used as the basis for some general conclusions about the future outlook.

"Needs...and requirements" Two different approaches are implied by the charge. "Needs", as used in the context of health manpower planning, refers to a normative idea of the number and type of personnel required to provide therapeutic and preventive services to a defined population. Need is usually defined independently of economic constraints. Demand, (or effective demand) on the other hand, refers to the number and type of personnel required to fill the available jobs and provide services for which consumers are willing and able to pay.

The committee elected to assess the future needs and requirements in terms of effective demand for allied health personnel. This was based on its judgment that this approach is most useful for realistic planning. However, in the case of long-term care (Chapter 8), the committee chose to take a patient-centered approach and examine the future need for allied health personnel.

Planning horizon The committee selected the year 2000 for its projections of future demand and supply. Because most of the base data are for the year 1986, this decision means, in effect, looking ahead 15 years. We recognize the enormous uncertainty that goes with so long a horizon. However, many decisions require some assessment of the future, however rough, and the types of decisions that affect the labor market for allied health practitioners, such as starting or modifying education programs, necessitate a long lead time. On balance, then, the decision was to take the long view.

Data for Assessing Demand and Supply

The study was limited to the use of existing data as the basis for its assessment of demand and supply in allied health fields because it was not possible to design, field, and analyze a survey within the available time, particularly with the requirement for Office of Management and Budget (OMB) approval of such a survey. The paucity of existing data concerning allied health fields severely constrained the committee's ability to carry out its charge. Thanks in large part to significant federal investment in developing data bases in medicine, dentistry, and nursing, previous IOM studies of those fields have been able to draw on large amounts of data and on requirements and supply projections made by the Bureau of Health Professions (BHP) based on those data. In the allied health fields, however, data are limited.

Nonetheless, data do exist. The Bureau of Labor Statistics (BLS) collects information on employment, earnings, and labor force behavior of a number of allied health occupations in its ongoing analysis of the United States workforce. The decennial censuses offer detailed information by occupation. Allied health associations conduct surveys of their members that provide invaluable data on persons meeting their membership criteria. Associations of hospitals, nursing homes, and home health care agencies collect data on employment in their constituent institutions.

These and other data sources have been examined to inform the committee's assessment of supply and demand. We point out problems and weaknesses in the data below, and offer some suggestions for improvement that, if heeded, will make an easier task for future groups.

Assessing Current Demand and Supply

How do we know if there is a current shortage of allied health personnel? This is not a straightforward question. First of all, the term shortage has a variety of meanings. Sometimes it is defined normatively: a shortage exists if there are fewer respiratory therapists than are needed, according to some definition of need. Economists define a shortage as fewer people employed than employers would like to employ at the current wage. Although cognizant of other factors that influence employers' decisions to employ workers and prospective employees' decisions to seek work, economists traditionally focus on levels of salaries and wages, and sometimes on fringe benefits, as the principal variable that serves to equilibrate employer demand and labor supply.[1] According to theory, if the labor market were functioning properly, a shortage could exist only temporarily, because employers would pay more to attract more workers until all jobs were filled. Thus, economists view the existence of any labor shortage as reflecting either lags in the adjustment of supply to demand, or imperfections in the functioning of the labor market. If demand grows at a rapid rate over a period of time, it is possible for there to be a temporary shortage. Barriers to adjustment can also result in supply and demand not coming into balance. These will be described later.

A shortage can be short-run or long-run, although long-run shortages are unusual unless there is some market imperfection such as a price ceiling that prohibits market adjustments. In the short run, workers must be recruited from the existing pool and employers must use existing technology. In the long run, however, new workers can be trained and new technologies employed to change the nature of the work.

Indicators of a Labor Shortage

A number of signals can indicate that at labor shortages exist. The signals include high job vacancies, rising compensation levels and low unemployment levels.

Vacancies The most commonly cited indicator of labor shortage is job vacancies. A high number of vacant positions or ratio of vacancies to total employment is taken as evidence of a shortage. "High", of course, is relative to some expected level of vacancies. This expectation may be based on historical vacancy levels for the occupation of interest, or on a comparison with current levels for other occupations.

Some vacancies exist at all times because of job turnover. Because job mobility is important to a well-functioning labor market, such vacancies can be viewed as a sign of health rather than pathology. As Hall has pointed out,

> The role of vacancies can only be understood against the background of the ceaseless motion within the labor market. . . .Every month, several million workers change jobs, and hundreds of thousands of others move in and out of the labor force. Much of this turnover is attributable to fluctuations in the labor requirements of individual employers and the rest to the changing circumstances of individual workers (Hall, 1978).

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[1] This is somewhat oversimplified because other aspects such as the risk involved in work and working conditions are also considered in economic analysis of labor demand and supply.

Vacancy rates are not reliable indicators of job opportunities for several reasons; the highest rates occur in occupations with the highest turnover; construction work is an example often cited. Among the health occupations, turnover is much higher for nurses' aides than for highly trained personnel such as medical technologists or physical therapists.

Also, reported vacancies should be viewed with caution. Vacancies do not always represent a shortage. If, through one mechanism or another, wages are kept below the level that would bring supply and demand into equilibrium, employer demand will always exceed the number of allied health personnel who want to work at the going wage. Such excess demand cannot really be characterized as a shortage, but rather as an imperfection in the operation of the market.

Sloan (1975), Yett (1975) and others have pointed out in the context of nursing that if the labor market is not competitive and therefore one or several employers have some control over the wage level, the market can be in equilibrium while vacant jobs exist. Such an employer would report vacancies but not raise wages in order to fill them. Another possibility is the systematic undervaluation of work in occupations in which female workers predominate. Institutional barriers such as long-standing custom, misperception of market conditions by employers, and inflexible recruitment practices may account for vacancies, rather than an insufficient number of qualified persons available to work.

Compensation Levels Another signal often interpreted as indicating a shortage is rising compensation levels. Wages are the most easily observed, but compensation in this case means the entire package offered by employers: wages or salaries, benefits, hours and conditions of work. If employers are not able to attract workers with the current package, they presumably will improve it. Increases in compensation levels, however, are not in themselves evidence of a shortage. Rather they can indicate normal, and often temporary, market adjustments in a situation of rising demand.

Relative changes in compensation levels are better indicators of labor market conditions than are absolute changes. If physical therapists' earnings are rising much faster than earnings in, for example, medical technology or teaching (fields requiring similar educational investments), and if employers are unable to fill vacant positions for physical therapists, we might conclude that there is a shortage, or at least that at present demand is outstripping supply. If market signals are sufficiently strong (that is, compensation rises, unemployment drops, etc.) the shortage presumably would be alleviated over time by new entrants to physical therapy. However, the interim may bring painful dislocations. Services may have to be curtailed, or substitute workers employed at an unacceptable decrement in quality. In some industries, of course, such dislocations are viewed as normal.

Unemployment Levels Some frictional unemployment (a level of unemployment resulting from the time involved in changing jobs) is characteristic of a dynamic labor market in which people change jobs, often with an interval between jobs. Unemployment levels will tend to be relatively higher in occupations with high turnover. Very low unemployment levels, where virtually everyone seeking employment is finding it, is another signal that may indicate a labor shortage. This would be especially true if vacancy levels remain high.

The employment experience of new graduates is one indicator of conditions in the labor market. If, for instance, most physical therapy graduates find work in the field within a year after graduation, the labor market may be tight. As with the other signals, caution in interpretation is needed. New graduates can be hired at lower wages than experienced therapists, and some employers may prefer to substitute less experienced workers for more experienced ones in order to keep costs down. In addition, new graduates tend to be more mobile and therefore their experience may be more favorable than others'.

Any one of these signals alone does not indicate a shortage. On the other hand, when a number of them occur together, especially if they persist over time, the more likely it is that there is a real problem. If employers are constrained from making adjustments such as substituting lesser trained employees (for example, corrective therapists for physical therapists) or importing workers from abroad, or if the necessary adjustments are unacceptable to society, it would be fair to call the problem a labor shortage.

Data for Assessing Current Vacancies

National data on job vacancies are not available. For both technical and budgetary reasons, the Bureau of Labor Statistics (BLS) does not collect vacancy data. The American Hospital Association (AHA) collects data on allied health employment, but not vacancies. Qualitative assessments are often made in surveys of local employers by, for example, education administrators. Surveys by professional associations may include questions about members' perceptions of the labor market in their communities. Anecdotal data is reported in health care journals and newsletters from time to time. Regional or state development bodies such as the state-sponsored Massachusetts Technology Development Corporation try to make assessments.

Data on Salaries and Wages

The BLS Industry Wage Survey program collects and publishes average straight-time hourly wages for selected occupations in hospitals and nursing homes in 23 Standard Metropolitan Statistical Areas (SMSAs). Hospital surveys were conducted in 1978, 1981, and 1985; allied health occupations covered include diagnostic medical sonographers, electroencephalographic technicians, electrocardiographic technicians, medical laboratory technicians, medical technologists, nuclear medicine technologists, radiation therapy technologists, radiographers, surgical technologists, all the therapy occupations, dietitians, medical record administrators and technicians. The survey excludes elements of compensation such as premium pay for overtime and work on night shifts or holidays, and in-kind compensation such as room and board. Fringe benefits also are excluded. These data are very useful for examining trends in basic wages in urban hospitals and nursing homes, and for comparing wage levels among SMSAs.

Occupational earnings are, as noted earlier, available from the Current Population Survey. Earnings of association members are collected in member surveys. The University of Texas Medical Branch at Galveston does annual surveys of 33 hospitals, 16 medical schools, and 28 medical centers.

Unemployment statistics are collected monthly by BLS. Although extremely useful in aggregate, these data have some weaknesses in assessing market conditions in specific occupations. Unemployed persons are classified by occupation according to that in which they were last employed. Thus, a person seeking work as an audiologist whose last job was as a teacher would be categorized as an unemployed teacher. Recent graduates seeking their first job are excluded from the unemployment figures by occupation. As with other market indicators, BLS occupational unemployment data must be used carefully and critically.

Surveys by allied health professional associations generally include information on whether their members are employed and where. Less frequently do they include information, such as whether the respondent is looking for work, that would complement data from the Current Population Survey. The Committee on Allied Health Education and Accreditation (CAHEA) has conducted surveys of education program directors about the offers to their graduates as a means of assessing the job market. Some state education departments conduct similar surveys. Some individual educators survey employers in their community regarding employment opportunities.

How to Improve Data on Current Supply and Demand

The current balance between supply and demand for allied health personnel is of concern to a wide range of organizations, educators concerned about jobs for their students, facility administrators concerned about the availability of needed personnel, allied health practitioners and their associations concerned with jobs, compensation and career prospects. In functional terms, an assessment of current supply and demand is the essential baseline data point from which projections start. In addition, current information about the labor market enables those in positions to do so to act early to prevent the occurrence of serious imbalances and the later need for major corrective action.

We have listed the types of data needed to make an estimate of current supply and demand. Some types are available, usually for only some allied health fields in some localities. Health care institutions already respond to heavy demand for operating data and are reluctant to add to their burden without believing that such data will serve their interests. Additional data collection activities should be undertaken only after careful consideration of the benefits of such efforts and ways of minimizing the burden of providing the data. The data to assess the current labor market conditions are more available for some health professions—such as physicians and nurses—than for allied health fields. The committee believes that lack of data about allied health fields compared with other types of providers reflects an underestimation of the role of allied health. Both the large contribution to care that practitioners make and the high total costs associated with aggregate use of allied health professionals strongly suggest that data collection strategies that allow assessment of current supply and demand should be seriously explored.

Associations of employers could try to develop simple, inexpensive surveys to learn about problems in recruiting; for example, what kinds of employees are you having the most difficulty recruiting? Are you using any exceptional measures to recruit? What actions are you taking to cope? This might be done in a very small sample of "sentinel" institutions as frequently as twice a year.

Professional associations should use standard terminology of labor statistics to increase the usefulness of their surveys to BLS and vice versa. It is especially important to count people who are not working but are actively seeking work; these are the people the U.S. Department of Labor categorizes as unemployed. Professional associations should explore longitudinal studies of a sample of their members to shed better light on their work histories, labor force participation, earnings, etc. than is possible from their usual cross-sectional surveys. In addition to technical improvements, associations should look for ways of making their research more relevant to policy. Associations would be well served to strengthen the links between their research and policy functions.

HRSA should reconstitute the Forum on Allied Health Data as a technical assistance endeavor, and hold workshops with experts in survey design, statistics, and labor economics to help the allied health associations improve their data collection. Other possibilities for improving the information on current labor market conditions for allied health personnel include the following:

o State licensing bodies could ask, when renewing licenses, if people are currently employed in their field, employed in something else, looking for work, or not looking for work.

o State and regional health planning agencies could make larger investments in education and employment data and planning. They could provide an important link with education institutions and employers.

o Educational institutions could pool information on the job-finding experiences of recent graduates and alumni. Local experience could be aggregated to develop a state and national picture.

Assessing Future Demand and Supply

Projections of the future go wrong either because they do not take the proper factors into account or because the factors change in ways that were not or could not have been predicted. However, decision making is based on assumptions about the future, however crudely formed. Our task has been to use the limited data available to make our best guess and to let that inform our recommendations. We have made recommendations based on interpretation of general trends in the work force and the economy and of specific projections for selected allied health fields.

Several approaches are available for assessing future needs and requirements for allied health personnel. Some approaches that have been used for other types of health manpower care described below to illustrate the options available, the ways they can be used and the types of data needed.

Needs-based projections usually define the number of personnel that would be needed to provide a given set of services to a defined population. The needs approach, which was pioneered by the Committee on the Costs of Medical Care in the 1930s, involves two types of judgment. One is of the quantity and type of health services judged to be appropriate, and the other is of the appropriate division of responsibility for those services among the various health personnel. Depending on who makes these judgments and their views of what constitutes good health care, the results can vary greatly.

The Graduate Medical Education National Advisory Committee, appointed by the Secretary of Health and Human Services in the late 1970's, employed a needs-based approach to project physician requirements for 1990. The committee started with estimates of the incidence of particular illnesses or medical conditions in the population and then made judgments about what conditions required medical care, how many visits would be required, and how many of those visits might be "delegated" to persons other than physicians. Total visits were transformed into physician requirements based on assumptions about productivity (Jacoby, 1981).

A model of requirements for nurses developed by the Western Interstate Commission on Higher Education also had its foundations in judgments of need. Panels of nurses provided professional judgments about desirable changes in health care delivery and about the mix of nurses, RNs and LPNs, needed to provide the desired services (Bauder, 1983).

These needs-based models represent an unconstrained social ideal. They are norms against which to compare actual performance. They can be used to establish health care program objectives and to assess the probable availability of personnel to meet those objectives.

Another approach to projecting health manpower requirements is to extrapolate from current levels. Instead of assigning ideal health services utilization levels (and their corresponding health personnel requirements) to projected population segments, current utilization levels are projected. Most simply, current health personnel-to-population ratios are applied to population projections. The Bureau of Health Professions uses this method to project physician requirements by starting with current utilization levels and then adjusting for projected changes in population, trends in health insurance benefits, and other factors affecting utilization such as prices of health services. Productivity assumptions are used to translate projected utilization into the number of physicians required. The Division of Nursing also employs a model that projects population, per-capita utilization of health services, and the associated numbers of registered nurses and licensed practical nurses.

The simplest of the extrapolation models is strictly mechanical; the health personnel-to-population model is an example. More sophisticated models incorporate "behavioral" components, such as the price elasticity of demand for health services, and make independent projections of prices. They also may incorporate changes in production technology such as capital-labor substitution, or the division of tasks among health personnel.

As extrapolation models become more sophisticated, they more resemble models of economic demand. A demand model is based on the relationships of independent variables such as health status, income, and prices, to the demand for health services. In the case of labor demand, the model is based on variables such as wages, the price of capital, and product prices. Although not strictly a demand model, the Bureau of Labor Statistics projections of employment are made in the context of projected labor force and economic activity.

The committee chose to rely heavily on the employment projections of BLS for its assessment of future demand. The principal reasons for doing so were:

- The BLS projections are grounded in projections of the entire economy, including projections of the workforce and levels of economic activity. Health expenditures and health industries employment are estimated in the context of growth in other types of expenditures and employment in all other institutions.

- The projections use a consistent methodology across occupations. Not only can the allied health occupations be compared with each other, they can be viewed in the context of all other occupations, for which projections have been made in the same way.

- The projections are widely known and used, and are reviewed regularly and revised biennially.

We did not, however, use these projections uncritically. Several factors must be taken into account when using the BLS data:

- Occupational employment projections are subject to considerable error, moreso than total employment by industry.

- The BLS staff use their knowledge and judgment to project the number of jobs for each occupation in an industry. For the health care industry many judgments have to be made about how changes in health care financing and delivery will impact different occupations. Since these judgments are not published it is difficult to subject the results to a critical assessment.

- The occupational definitions used by BLS are not identical with those of professional associations or educators. Although great improvements have been made in occupational classification, BLS definitions rely more heavily on functions and less heavily on credentials. Too, the data are not adequate in some cases to distinguish different levels within occupations. For instance, the BLS combine data for laboratory technologists and technicians. In some instances, as for perfusionists, dialysis technicians, and cardiovascular technologists, no employment projection is made. For further discussion and evaluation of BLS data see Appendix V.

How BLS Makes Employment Projections

Because the committee relied heavily on the Bureau of Labor Statistics for its assessment of future demand, it is important that the reader understand how these projections are made. The Bureau of Labor Statistics projections are made from a base year to a target year. The base for their most recent projections was 1986; the target year was 2000. In a background paper prepared for the committee by Harold Goldstein the BLS approach was characterized in the following manner:

> The basic approach followed is to estimate the employment in each occupation that will be generated by economic demand. This goes back to the demand for the goods or services the occupation provides, and this in turn is affected by the total spendable income available to consumers and government and to the changing patterns of what they spend it on. These are influenced by a wide variety of social and economic factors, including changing tastes and styles, scientific discoveries and technological change affecting both what is produced and how it is produced, the growth and changing composition of the population, taxation and government expenditures policies ('guns or butter'), and what other countries are buying from and selling to us. (Goldstein, 1987)

Several steps are involved in the projection sequence, the first of which is the projection of the labor force. The foundation for this projection is the Census Bureau's population projections by age, sex, and race. These projections are based on assumptions about birth rates, death rates, and migration in and out of the United States. The labor force participation for each age-sex-race group is projected by extrapolating past participation rates. The projected labor force participation rates are applied to the corresponding population projections to arrive at the projected labor force in the target year.

Next, BLS uses a macroeconomic model to develop projections of Gross National Product and major categories of demand and income. Some of the assumptions affecting the macroeconomic model, such as population projections, are fairly certain; other assumptions, such as net imports, energy prices, and the exchange value of the dollar, are very uncertain, depending as they do on international political and economic developments. Because assumptions about certain key variables have major impacts on the projections, BLS produces four sets of macroeconomic projections based on three sets of assumptions. These assumptions are about level of expenditures in major components of federal spending, the major components of state and local government spending, the size and composition of the population, and the key variables underlying foreign trade; low, medium, and high projections of GNP are made from differing assumptions for each of these variables.

Below are some of the assumptions that were used in the projections for 2000:

	Low	Moderate	High
Federal defense spending ($ billions).	222.5	251.0	263.0
Federal nondefense spending ($ billions).	97.3	103.4	108.2
State and local spending on education ($ billions).	195.3	223.1	232.5
Civilian labor force (millions).	134.5	138.8	141.1

The effect of these variations in assumptions can be seen in the impact on Gross National Product, and employment. The low, moderate, and high projections of Gross National Product resulting from these and other assumptions are (in billions of dollars) $4,617, $5,161, and $5,552. The corresponding projections of total employment (in thousands) are 126,432, 133,030, and 137,533 (Monthly Labor Review, September 1987).

Next, BLS estimates the principal components of GNP: personal consumption of durable and nondurable goods and services, capital investment, foreign trade (imports and exports), and government expenditures. These estimates of final demand are translated into estimated levels of production for each industry in the economy using an input-output table, based on historical relationships, compiled by the Department of Commerce. The input-output table shows what each industry in the economy purchases from every other industry. For example, the automobile industry purchases raw materials (iron ore), intermediate products (tires, glass), and services (electrical power, transportation) from other industries in order to produce its final product, automobiles (Goldstein, 1987). This step results in estimates of the level of production for every industry in the target year.

The next-to-last step of the process is the estimation of total employment for each industry from a regression equation that estimates worker-hours as a function of industry output, the unemployment rate (a measure of capacity utilization), the relative price of labor, and the ratio of output to capital. The estimated worker-hours are translated into workers by dividing by estimated annual hours per worker.

Finally, the BLS develops estimates of occupational employment by industry, utilizing base-year data on the distribution of industry employment by occupation. Sources of data include the Occupational Employment Statistics (OES) surveys conducted periodically by state employment security agencies under a BLS-state cooperative program (see Appendix V for discussion of OES and other data sources), the Decennial Census and the Current Population Survey. In projecting occupational employment in each industry, adjustments are made in the occupational composition of the industry.

The health services industry is broken into components composed of the different settings of employment, such as hospitals, physicians' offices, and nursing homes. The next step of the process takes into account factors not explicitly included in the mathematical model. BLS analysts with responsibilities for specific occupations consult experts such as professional associations' staff, use the relevant literature, and make site visits to assess whether staffing patterns are likely to change, and how they will change. Because the aggregate employment for each industry provides the parameters of employment, BLS analysts confer with each other to determine how each occupation in each industry will fare relative to one another. For example, the analysts who follow health occupations will meet to discuss hospital staffing patterns, what changes are expected and why changes will occur. Factors taken into account include new technologies likely to change staffing intensity, changes in insurance coverage, and regulatory policies influencing the demand for a service or individual occupation.

Table 2.1 shows the low, moderate, and high projections of employment in allied health fields for 2000. Differences among the three projections are attributable only to different assumptions about economic growth and aggregate employment. The same assumptions about and adjustments to the occupational distribution of employment are used in all three.

TABLE 2.1: Bureau of Labor Statistics Wage and Salary Employment, Actual 1986 and Projections for 2000

Occupation	1986 Employment	Projected Employment 2000 (thousands) Low (a)	Moderate (b)	High (c)
Clinical Laboratory Technologists and Technicians	238	285	296	307
Dental Hygienists	87	134	141	145
Dietitians	88	52	54	55
Emergency Medical Technicians	65	73	75	77
Medical Record Technicians	40	67	70	72
Nuclear Medical Technologists	10	12	12	12
Occupational Therapists	26	43	45	46
Physical Therapists	56	109	115	118
Radiologic Technologists and Technicians	114	183	190	196
Respiratory Therapists	56	74	76	78
Speech-Language Pathologists/ Audiologists	42	58	61	63

SOURCE: Silvestri, G.T. and Lukasiewicz, J.M. 1987. Monthly Labor Review, Vol. 110, No. 9 (September):46-63.

a) Low projection represents annual growth rates of 1.6 percent in GNP, 1.0 percent in the civilian labor force, and 0.9 percent in employment.

b) Moderate projection represents annual growth rates of 2.4 percent in GNP, 1.2 percent in the civilian labor force, and 1.2 percent in employment.

c) High projection represents annual growth rates of 3.0 percent in GNP, 1.3 percent in the civilian labor force, and 1.5 percent in employment.

Future Supply

In a dynamic labor market, the supply of workers in an occupation is constantly changing. New graduates emerge from education programs. People enter the labor market who have worked in other occupations or who have studied related subjects. People leave the work force and later re-enter; some leave permanently.

Projecting future supply requires, first, estimating how many people are in the field in a base year, and then estimating the various inflows and outflows that will occur between the base year and the target year. Which inflows and outflows are important depends on the purpose of the projection.

For example, in nursing, there has been concern that there are many trained nurses who are outside the nursing work force, working in other fields or, not working at all. Although data on licensed nurses provide a picture of those nurses who keep their licenses active, some have argued that there may be many nurses who have dropped their licenses but who, in some sense, constitute potential supply. If market conditions warrant, the argument goes, these nurses could be attracted back to work, even if some retraining were necessary. This pool of trained workers can be estimated, and projected, using data on the number of graduates and applying standard mortality rates to each age group. The supply estimated by this life table approach represents an estimate of all living nursing graduates (West, 1983). For this purpose, the only inflow is new graduates and the only outflow is death.

If the question is, however, whether there be enough nurses to fill the jobs that we expect to be available in the future, more information is needed about the likelihood that the ones who are not in the work force will re-enter. We also need to know about the likelihood that those who are in the work force will leave. Variations in the rates of re-entry and loss from the labor force and the average time practitioners spend in the labor force make large differences in the supply projected for the future. For most purposes, in other words, it is the "effective" supply of health personnel, trained and wanting to work, that is of greater interest.

The committee has, where feasible, projected what the future supply in allied health fields would be in the year 2000 if inflows and outflows from the labor market were to remain as in 1986, and if allied health program graduates remained at the current level. These assumptions are unrealistic, but are used to indicate the magnitude of change that must take place to meet future demand. A simple arithmetic equation was used. The workforce at the beginning of one year was said to equal the workforce at the beginning of the year before, minus persons leaving the workforce for reasons other than unemployment, plus graduates of allied health programs and other additions. These additions include people resuming work and people transferring from other occupations.

The base year for our observations was 1986. To achieve comparability among fields, the BLS estimate of total employment for each occupation was used. An estimated number of unemployed practitioners was added in each case.

For some allied health fields the number of graduates in 1986 was assumed to remain constant through 2000. When it was reasonable to do so, the 1986 share of bachelor's degrees granted in a field, relative to all bachelor's degrees granted, was applied to the Center for Education Statistics' projection of bachelor's degrees to be granted each year through 2000.

Labor force accession and separation rates that the Bureau of Labor Statistics derive from Current Population Survey (CPS) data were used to determine additions to and losses from the workforce. Because the sample size of most allied health fields in the CPS is small and estimates subject to large sampling variability, we used rates of labor force accession and separation for larger groups. For example, the rates for therapists overall were applied to physical, occupational and respiratory therapists. In approximating additions to the workforce, the accession rate for 1983-84 was applied to the 1984 workforce to generate an estimate of the number of persons who joined the workforce in 1984. That number was held constant each year.

In Chapter 4 we bring together what the committee knows about supply and demand for allied health practitioners. We evaluate the BLS employment projections for each field to the year 2000 in light of expectations about the forces that drive demand. The results of the process to estimate supply described in this chapter are compared to expected demand. To this we added knowledge of how the fields are faring in the current labor markets and in the trends in numbers of graduates and programs to make an assessment of the future balance between supply and demand.

Data for Projecting the Future Supply

Current (Base Year) Supply

The BLS Industry-Occupational Employment matrix provides an estimate of the number of employed persons in each of 480 occupations. It is not an unduplicated count; wage and salary workers holding two jobs would be counted twice. The most recent data, used as the base for employment projections to the year 2000, were for 1986. The next year for which these data will be available is 1988.

The occupational classifications used in the OES, the principal source of data for the matrix, are consistent with the Standard Occupational Classification used by all federal agencies that collect data. They represent a balance between comprehensive coverage and quality data and the ability (and willingness) of employers to respond. The current definitions used in hospitals appear in Appendix III. These categories and definitions should be continually evaluated and modified, if necessary, to accurately portray the allied health workforce.

The other data source for examining the base year supply is membership data from allied health associations. For fields that are well defined and have a single route of entry, and in which the associations represent a very large proportion of the field, as in occupational therapy, this usually is a good estimate. For many allied health fields, however, association membership data are incomplete or nonexistent. See Appendix IV for discussion of different sources of data on supply for each field.

New Entrants

For fields in which the bachelor's degree is the entry level, there are two main sources of data. The U.S. Department of Education collects historical data on degrees awarded by field of study. These data include the allied health fields of occupational therapy, physical therapy, dental hygiene, medical record librarianship, medical laboratory technologies, radiologic technologies and speech pathology and audiology. The Center for Education Statistics periodically makes projections of the total number of bachelor's degrees, and the number of awards to men and women. These projections are based on mathematical projections of historical trends in college-going by different age groups. As discussed above, the committee has projected new entrants from bachelor's degree programs in some fields by assuming that the field's share of bachelor's degrees in the years 1987 through 2000 will remain constant at the 1986 level.

The second principal source of data on new graduates is the bodies that accredit education programs. CAHEA is the largest, representing 24 allied health field occupations in 1987. Others include the American Physical Therapy Association (APTA) and the American Speech-Language-Hearing Association (ASHA). Historical figures on graduates can be extrapolated for the future to estimate future new entrants. Individual states can use data from their own higher education institutions.

Other Inflows

The weakest links in projecting future supply are the data for estimating entrants from outside the labor force, from other occupations, and from abroad (immigration). These inflows (and mirroring outflows) represent very important short run labor market adjustment mechanisms. The BLS staff has made some headway by matching CPS data and calculating inflows and outflows for the matched observations (Eck, 1984). However, for small occupations such as many in allied health, these estimates are based on an extremely small number of observations. This is an area where associations could do a great deal to improve the data. The Forum on Allied Health Data, with appropriate expert consultants, should give attention to this serious weakness in the data.

Conclusions and Recommendations

The committee found that available data for assessing the supply of allied health personnel is inadequate, and suggests that efforts be made to improve the data. The employment (demand) projections of BLS are very valuable, and, used in conjunction with other data, are likely to be the only demand estimates available that are comparable across fields.

The federal government has a responsibility to monitor the health workforce and to inform participants in the health labor market, and public policymakers of trends and developments. The work of the Bureau of Health Professions, the Bureau of Labor Statistics, and The Center for Education Statistics is to be commended and should be built upon. In order to improve the data on allied health fields, the committee recommends that the Secretary of Health and Human Services convene an interagency task force composed of representatives from the Bureau of Labor Statistics, the Center for Education Statistics, and other agencies that collect relevant data on the allied health workforce. This task force should work toward increasing the amount and improving the quality of data needed to inform public policy decision makers, health care managers, unions, prospective students, and academic institutions about the allied health occupations.

Staff for the task force should be provided by the PHS focal point for allied health personnel that is recommended in Chapter 5.

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CHAPTER 3

FORCES AND TRENDS IN DEMAND AND SUPPLY

Chapter 1 described 10 allied health fields. People working in these fields have seen their roles evolve in response to forces such as demographic change, disease patterns, financing trends and structural changes in the delivery system, and technological development. This chapter examines these and other forces to establish a context for Chapter 4 which discusses demand and supply in individual allied health fields. Before looking individually at each of the environmental pressures that predictions of the future must take into account, the interaction of several forces in one allied health field—respiratory therapy—is illustrated.

The Movement of Respiratory Therapy into the Home: The Role of Interactive Forces

The movement of respiratory therapy into the home is an example of how several environmental forces acting together may impact on the evolution of a health service. These forces may bring about a shift in worksite and affect practitioners' independence, earnings, and educational requirements.

As with other allied health services, some respiratory therapy services have shifted from hospital-based to home-based delivery. Although respiratory therapists have long provided oxygen to patients at home, only recently have technologically advanced life support systems, such as mechanical ventilators, been widely used in the home. Several forces operating together may accelerate the trend toward home delivery of respiratory therapy. These include demographic change and technological change. Health care financing policies are ambivalent in their effect.

Demographic Change As of 1984, approximately 28 million Americans, 11.9 percent of the population, were 65 or older, and the 75 plus group is now the fastest growing age segment of the population (Office of Disease Prevention and Health Promotion, 1987). This aging of the population can be viewed in terms of its relationship to disease prevalence; as the population ages, chronic diseases grow more prevalent. It is estimated that over 3 million Medicare patients suffer from chronic obstructive pulmonary diseases such as emphysema, chronic bronchitis, and asthma.

Almost a quarter of a million others experience breathing difficulties for reasons other than pulmonary disease, such as spinal cord injuries. As many of these conditions progress, respiratory therapy becomes necessary.

Technological Change Several innovations in technology make home-based respiratory care feasible and more acceptable to patients. For instance, equipment has become smaller. Some microprocessor-controlled ventilators and suction machines are compact enough to be mounted on wheelchairs or specially made carts, giving people a measure of mobility.

Health Care Financing Policies Environmental forces are not always expansionary. Health-care financing policies, including pressures to cut health care costs, may fuel the move to home care. On the other hand, policies may be used to curtail an expansion of home care that is made possible by new technologies.

Medicare's prospective payment system (PPS) is stimulating the need for respiratory therapists outside the hospital. PPS gives hospitals a strong incentive to discharge all patients as quickly as possible, thereby reducing the hospitals' costs. Pulmonary patients, though well enough to be discharged, are often in need of care at home. Medicare, however, does not reimburse the home care services of respiratory therapists on a per visit basis. Rather, the cost of their services may be included as an administrative expense by agencies providing home care services. Only six percent of home health agencies retain a respiratory therapist. The rest occasionally consult with therapists, contract with durable medical equipment services, or arrange short-term training courses for their nurses assigned to pulmonary patients. Respiratory therapists employed by suppliers of oxygen and other equipment are reimbursed by Medicare's durable equipment benefit. In a 21-state survey, the American Association For Respiratory Care (AARC) found that Medicare and Medicaid were paying more than $270,000 per year per ventilator-assisted hospital patient. AARC estimates that the cost for equivalent care in the home would be $21,000 per year. Furthermore, it was estimated that over 2,000 chronic ventilator-dependent hospital patients were well enough to be cared for at home (Gilmartin and Make, 1986). The Health Care Financing Administration argues however, that expanding Medicare coverage to include home-based respiratory care could very likely serve to increase Medicare costs since it would be difficult to limit specialized care to those persons who truly need it (Health Care Financing Administration, 1986).

In sum, financing policy has both provided an impetus for respiratory home care as well as impeded its growth. Improved technology (spurred on by the availability of financing) has made respiratory home care feasible, and the increasing number of elederly in the population has heightened demand for such a service. The social value placed on independent living has increased the marketability of delivering of services in the home and has placed pressure on policy makers to expand insurance benefits to include home-delivered care.

The remainder of the chapter examines a number of forces individually to see how each impinges on the demand and supply of allied health personnel and to emphasize how an understanding of these forces can help local decision makers interpret change in their own environment.

Forces that Drive the Demand for Allied Health Practitioners

Population Growth and Demographic Trends

Demographic trends provide clues about tomorrow's health care consumers and their health care needs. An analysis of changes in the composition and growth of the U.S. population shows how these translate into changes in health care needs.

Population growth is slowing. The United States population increased by one percent annually between 1972 and 1986, but the Bureau of the Census projects growth of only 0.8 percent yearly to 2000. The rate of growth will not be uniform among age, race, or ethnic groups, as shown in Table 3.1 based on the moderate projections by the Bureau of the Census (Fullerton, 1987). Minority races will grow faster than whites; the number of children and youths (with exception of high-school youths) will decline; the working-age population will grow twice as fast as the total population; and the number of people of retirement age will increase with the greatest rate of increase occuring among persons 85 or older.

The Elderly Between 1940 and 1984 the number of people aged 65 and over more than tripled, growing from 9 to 28 million, and is anticipated to grow to 35 million, 13 percent of the population, by 2000. While increases in the number and proportion of individuals over 65 have been considerable, a faster rate of growth is evident in the very old segment of the population. In 1950 there were just 600,000 people over 85; by the year 2000 that number is expected to have increased nearly 8 fold.

As the number of elderly increases, the demand for allied health practioners in a variety of fields will rise accordingly. About 17 percent of occupational therapists' total practice in 1982 was in providing service to the elderly in nursing homes and acute care hospitals. Audiologists now spend one-third of their time with older persons (National Institute on Aging, 1987). Using straight line projections and assuming that the mix and ratio of personnel to patients will be the same in the year 2020 as today, the National Institute on Aging estimates that twice as many occupational and physical therapists will be needed in 2020 as are available today. Forty percent more audiologists will be required to maintain service at its current level (National Institute on Aging, 1987).

TABLE 3.1: U.S. Population by Race and Age, 1986 and projected 2000.

	1986	2000	Percent Change 1986-2000	Percent Distribution	
	(millions)			1986	2000
Total Population	241.6	268.3	11.1	100.0	100.0
Race					
White	204.7	221.5	8.2	84.7	82.6
Black	29.4	35.1	19.4	12.2	13.1
Asian & Other	7.5	11.6	54.7	3.1	4.3
Ethnicity Hispanic	18.5	30.3	63.8	7.7	11.3
Age					
0-4	18.1	16.9	-6.6	7.5	6.3
5-13	34.2	33.5	-2.0	14.2	12.5
14-17	14.8	15.3	3.4	6.1	5.7
18-24	28.0	25.2	-10.0	11.6	9.4
25-64	116.3	142.5	22.5	48.1	53.1
65-84	26.4	30.3	14.8	10.9	11.3
85 and older	2.8	4.6	64.3	1.2	1.7

SOURCE: Fullerton, H. N., Jr. 1987. Labor Force Projections: 1986-2000. Monthly Labor Review. Vol. 110, No. 9 (September).

Children Between 1980 and 1984, the number of school age children fell by 2.5 million. During that same period, however, the under five population rose 9 percent to 17.8 million. This was the largest under five population since 1968, when it was 17.9 million. The Bureau of the Census expects there to be fewer children under five (16.9 million) by the year 2000, and the number of children as a whole (under 17 years old) will fall from 67.1 million in 1986 to 65.7 million in 2000 (Fullerton, 1987).

Children and adults use health services differently. Children have less need of acute care services and have fewer hospital days (National Center for Health Statistics, 1986). A reduction in the number of children in the population does not affect demand for all allied health practitioners. For those practitioners employed by schools (speech-language pathologists for example), the number of children in the population impacts noticably on demand. For practitioners focused on acute care, the impact, if any, is only slight. Children are also major users of disease prevention services, some of which employ allied health practitioners—dental hygienists in dental caries prevention for example. For practitioners in many allied health fields, children represent only a small portion of their practice.

The implications for allied health practioners of the predicted drop in the numbers of children in the population must be balanced against the effect of disease prevention efforts and the vigor with which such efforts are being made.

The demand for those allied health personnel who are most central to child health services—dental hygienists, speech-language pathologists, and audiologists, for example—will depend to a great extent on public investment decisions that are often made at the local level. Local funds are the sole source of support for health education programs in 75 percent of all school districts. About 20 percent of school health education programs receive state funding, and only 3 percent receive federal, private, or special funds for health education programs. (Office of Disease Prevention and Health Promotion, 1987).

Minorities One out of five persons in the U.S. in 1986 was a member of a minority group. Blacks, the largest group, numbering 29.4 million, constituted 12.2 percent of the total population in 1986. By 2000, 35.1 million blacks will represent 13.1 percent of the population. The number of Hispanics is rising even more sharply. Hispanics totaled 9.1 million in 1970, 18.5 million in 1986, and are expected to reach 30.3 million—over 11 percent of the population—in 2000. The number of Asian/Pacific Islanders in the United States is also growing rapidly. Between 1970 and 1980 this population grew 120 percent to 3.7 million. By 2000 it will be 11.6 million (Fullerton, 1987).

The prevalence of some diseases is higher among minorities than among whites. Diabetes, for example is far more prevalent among blacks than among whites, and the incidence rate for cancer in 1983 was highest among black males. Among native Americans, cirrhosis, pneumonia, and diabetes are more common than among whites, and the prevalence of diabetes among Mexican Americans is nearly twice that among whites. (Office of Disease Prevention and Health Promotion, 1987).

The changing proportion of the minority population and the higher prevalence of some diseases among the various groups in that population may impact on demand for services as health care needs change. However, factors such as financial and geographic access barriers also influence demand for health care services, however, and health care needs do not always translate into demand for services. Minorities, who are more likely than whites to lack health care insurance, consistently report having greater difficulty than whites in gaining access to medical care. Twenty-six percent of Hispanics have no medical coverage compared with 9 percent of whites and 18 percent of blacks (Office of Disease Prevention and Health Promotion, 1987).

These differences between whites and minorities in their access to health care are reflected in health care utilization rates. Twenty percent of blacks and 19 percent of Hispanics, compared with 13 percent of whites, indicate they have no usual source of medical care. The percentage of people 4-16 years old who had never received dental care between 1978 and 1980 was higher among Mexican-Americans (30.7) than among blacks (22.3) or whites (9.7). Similarly, the percentage of individuals with no physician contact was higher among Mexican Americans (33.1) than among other Hispanics (23.9), blacks (23.8), or whites (20.4) (Office of Disease Prevention and Health Promotion, 1987).

The expected increase in minority population groups to the year 2000 could have an impact on need for the services of allied health practitioners. For these needs to translate into effective demand, however, some barriers to care must be eliminated.

Disease Patterns

There are two changes in the disease patterns within the United States that deserve special attention because of their potential impact on allied health personnel. First, there is the growing epidemic of the acquired immuno deficiency syndrome (AIDS). Second, whereas infectious diseases such as influenza, smallpox, and tuberculosis were the leading causes of death at the turn of the century, chronic diseases predominate today.

Acquired immuno deficiency syndrome AIDS is a notable and unexpected exception to the trend of declining death rates from infectious disease. As of 1987, an estimated 1.5 million Americans were infected with the HIV virus. AIDS cases in the U.S. rose from 183 in 1981 to nearly 40,000 by the middle of 1987. Over 75 percent of persons diagnosed with AIDS die within two years of the diagnosis.

As the disease spreads, and if the life expectancy of infected individuals lengthens, the health care system will be increasingly taxed. In 1985, AIDS caused 23,000 hospitalizations, an increase from the estimated 10,000 of the year before. The average length of stay for AIDS was more than double the overall average of 6.5 days (Trafford, 1987). The federal government estimates that it will spend one billion dollars on AIDS in fiscal year 1988, with 40 percent of that going to patient care. An estimated $8 billion to $16 billion in direct medical care expenditures is estimated for 1991 (Health Resources and Services Administration, 1988).

Estimating the impact of AIDS on the demand for allied heath personnel is fraught with uncertainties. Greater precision in estimating needs and workloads will come from a better understanding of some key determinants. Epidemiologists can only roughly estimate the number of individuals currently infected as well as those who will develop the full-blown symptoms of the disease.

The disease manifests itself in many forms and treatment patterns vary. The progression of the disease often resembles chronic illnesses of old age (dementia and wasting, for example). AIDS patients therefore need some of the same services as the elderly and compete for scarce resources such as skilled nursing care and home health service (Health Resources and Services Administration, 1988). Use of acute care facilities relative to community settings now varies among localities. The introduction of new preventive, diagnostic and treatment modalities may alter the mix of personnel and settings of care in ways that are now difficult to predict. Methods of financing care may also play a role in determining the type and focus of care.

Some allied health fields already play a major role in addressing AIDS; for others, their role is still emerging. Clinical laboratory personnel are not only conducting the tests used to detect the virus that causes the disease, but are facing a heavier workload generated by the secondary infections that AIDS patients acquire. Occupational therapists are helping AIDS patients learn how to conserve their energy, and respiratory therapists provide care to patients who develop lung infections. A host of counselors are emerging to assist patients during the various stages of the disease.

The committee noted growing concern about the impact of AIDS on the supply as well as the demand of allied health practitioners. Some educators fear that potential allied health students may be dissuaded by the perceived increased risk of exposure to the disease. To date, there has been nothing beyond anecdotal evidence to indicate that this is a serious factor in career choice.

Chronic Diseases Chronic conditions are the most prevalent health problem for the elderly, and the proportion of elderly in the population is increasing. More than four out of five persons 65 and over have at least one chronic condition and multiple conditions are commonplace among older persons (U.S. Senate Special Committee on Aging, 1987).

The demand for allied health practitioners may be influenced both by efforts to curtail the incidence of chronic disease, and by medical successes in treating chronic conditions. For example, some allied health fields are directly affected by widespread efforts to reduce risk factors for cardiovascular disease. Clinical laboratory personnel are conducting more blood tests and dieticians are providing more counseling in an effort to determine and control cholesterol levels. Increased rates of survival in cases of stroke and heart attacks may mean increased demand for health care since the majority of patients do not make a full recovery (Office of

Disease Prevention and Health Promotion 1987). Of the nearly two million stroke patients in the U.S., 40 percent require special services and 10 percent require total care. Results from the Framingham Study indicate at 31 percent of stroke survivors needed assistance in self-care and 2.7 percent required help in ambulation when examined an average of 7 years after their stroke (Office of Disease Prevention and Health Promotion, 1987).

Economic Growth

The growth of the economy as a whole tells how much income will be generated, and how this will affect government spending and the income available for families to spend on health care as well as other kinds of consumption and savings.

There are many uncertainties involved in projecting economic changes. They range from policies that will be adopted on taxes, government expenditures, foreign trade, events such as wars and revolutions, to scientific discoveries affecting technology, and even the weather that may kill crops or create disasters. Making a projection entails making assumptions as to how each of these will affect economic change. The Bureau of Labor Statistics, whose employment projections we use, details a long list of assumptions and calculates a high, a low, and a moderate projection to illustrate that there is a range of error around any projection, and to describe the sensitivitiy of the projections to these variables. (Data for the following discussion of the BLS economic projections are found in Saunders, 1987).

Personal income affects all kinds of expenditures, including health care spending, in many ways. For instance, it influences what consumers are willing to spend on health insurance. This sector of the economy also contributes about a quarter of national health care expenditures through direct, out-of-pocket payment for services (Health Care Finanacing Administration, 1987). Real disposable income (income after taxes and before inflation) is expected to grow by 2.4 percent annually, less than the 2.7 percent in the previous 14 years (low projection, 0.7 percent; high 1.9 percent). From this is derived personal consumption expendtiures on services (of which health services are a part), which are expected to grow faster than total personal consumption expenditures, as it has in the past: 3.0 percent, compared to 3.2 percent in 1972-1986. (Low projection, 2.2 percent; high projection, 3.3 percent.)

Government spending is influenced by economic conditions. The BLS projects higher federal government spending in their high growth projection than in their low growth projection. This is important for health care employment because the federal government accounts for nearly 29 percent of national health expenditures. The BLS projects the Medicare portion of federal health expenditures in constant dollars. The increase from 1986 to the 2000 low projection is 30 percent, and to the high projection 62 percent. Between 1986 and 2000 moderate projection a 43 percent increase in expeditures is projected (Saunders, 1987). These differences could have an effect on those allied health practitioners whose employment is significantly dependent on Medicare spending.

Private health insurance, which pays over 30 percent of national health expenditures, is affected by economic conditions in sevral ways. For instance, the size of corporate profits can affect the richness of the benefit packages and health insurance that employers offer employees. Furthermore, the number of people covered by private insurance depends, in part on the unemployment rate, which in turn depends on economic conditions. Because unemployed people often lack health insurance, in times of high unemployment demand for nonessential (and some essential) care is reduced, and health care employement will be reduced too.

Structure of the Health Care Industry

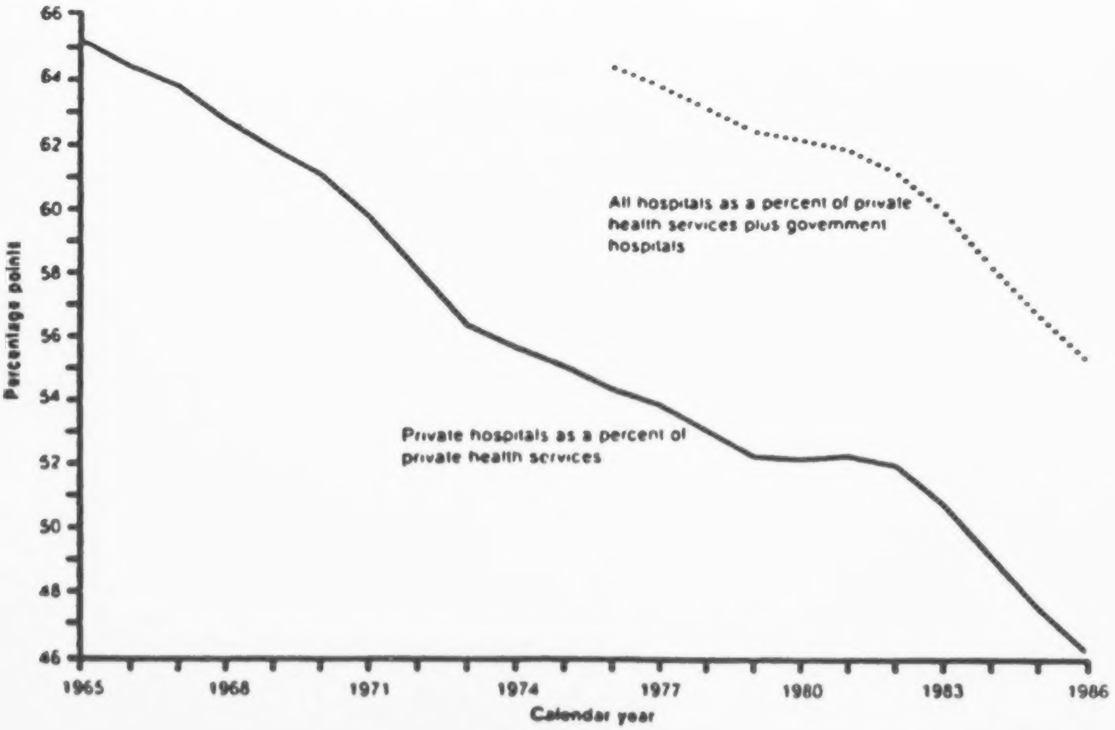
The structure and organization of health services is constantly evolving in response to such forces as the availability of money and manpower, regulation, consumer demand, financial incentives, and technology. Major changes of recent decades include the growth of multi-hospital systems and investor-owned health care providers, the growth of managed care, and the movement of care from inpatient service into outpatient departments, physicians' offices and specialized freestanding centers. Figure 1 illustrates the decline in the hospital as the prime employment site for the health industry. This decline reflects a structural change—hospital's fall from primacy in health care provision.

Structural changes may or may not impact on health services delivery and the demand for health care workers. Changes in the location of a service may represent only a change in worksite for allied health personnel, without altering the number of persons employed. For example, hospital admission testing is today often done on an outpatient basis and unless there is a change in the volume of tests performed, there is no numerical significance for employment. Although structural changes may not affect demand, they could have an effect on education requirements and regulation. Practitioners may need new levels or arrays of skills in the new settings, and new quality concerns may emerge resulting in changes in regulation.

Other changes in the structure of the health care industry have considerable implications for demand for allied health practitioners. For example, as patients' length of stay in a hospital becomes shorter, the need for home care increases and more practitioners may be needed. To determine whether a change in the location of care has implications for demand, one must ask whether each allied health field used in the traditional location is likely to be used in the new setting, and whether volume of service and productivity will change?

Figure 1

Hospital Employment as a Percent of Health Industry Employment:
Calendar Years 1965-86



Source: U.S. Bureau of Labor Statistics: Data from the establishment survey. Employment and Earnings. Washington. U.S. Government Printing Office, various issues in 1986 and 1987. From Health Care Financing Administration, Division of National Cost Estimates. 1987. National Health Expenditure, 1986-2000. Health Care Financing Review. Vol. 8, No. 4 (Summer):5-36.

The growth of HMOs has to date had no real impact on allied health employment. A 1987 survey of allied health employment in 56 HMOs (including staff, group, and independent practice association (IPA) models) across the country, found that employment for most allied health fields is not substantial. For example, 22 HMOs employed a total of 110 medical technologists; 26 HMOs employed 42 nutritionists and 13 HMOs employed 34 physical therapists. Respondents did not expect to employ larger numbers of practioners in the near future (Rudman et al., 1987).

The formation of multihospital systems is important to allied health employment if these systems staff differently than independent hospitals. Studies comparing staffing in different types of hospitals have often focused on ownership characteristics such as public, private, for-profit, not-for-profit (see, for example, Watt et al., 1986; Mullner and Andes, 1985). Little is known about the differences in staffing between independent and multi-institutional facilities.

The Bureau of Labor Statistics (BLS) projects employment in the health care industry to the year 2000 (Personick, 1987). (See Appendix V for a detailed discussion of these projections.) The projections take into account some structural changes discussed in this section. Notably, the BLS forsees hospitals increasing employment despite the shift to outpatient care. This is largely due to the expected increase in elderly people and advances in technologies. Table 3.2 shows actual employment in 1986 in five health care settings, and the BLS projections to 2000. Outpatient facilities with an annual growth rate of 4.6 percent are expected to show the highest growth rate and ranks as the second fastest growing industry in the economy in terms of employment. But, because the private hospital sector is so much larger, its one percent per annum increase will add almost as many jobs as the 4.6 percent growth of the outpatient setting. The second fastest growing sector—offices of health practitioners, reflects the growth of such activities as physicians' office labs, office surgery, and independent allied health practices. Nursing homes will also experience rapid growth as the aged population grows and early discharge from hospitals increases demand for nursing home care. Thus, an additional 800,000 jobs will be generated by nursing and personal care homes by the year 2000.

Health Care Financing

Health care expenditures in the U.S. are rising. In 1986 an average of $1,837 per person was spent on health care for a total of $458 billion. This constitutes 10.9 percent of the GNP, up from 10.3 percent in 1984 and 5.9 percent in 1965. The Health Care Financing Administration projects health care expenditures in 2000 of $1.5 trillion—of which the federal government will pay almost one third, private insurance 30 percent, and patients will pay one quarter (Health Care Financing Administration, 1987). As health care payers look to the future, the picture is one of increasing costs as the population ages and scientific advances make care ever more complex.

TABLE 3.2: Wage and Salary Worker Employment in Health Services. 1986 Actual and 2000 Projected.

Setting	1986	2000	Annual increase (percent)
Health Services excluding Federal Hospitals	7,599	10,844	2.6
Total Private Health Services	6,551	9,774	2.9
Offices of Physicians, Dentists and other Health Practitioners	1,672	3,061	4.4
Nursing and Personal Care Facilities	1,250	2,097	3.8
Private hospitals	3,038	3,513	1.0
State and Local Hospitals	1,048	1,070	0.2
Outpatient Facilities and health services, not elswhere cited	591	1,103	4.6

SOURCE: Valerie A. Personik, 1987 Projections 2000: Industry Output and Employment Through the End of the Century. Monthly Labor Review, 1987. Vol. 110, No. 9(September):40-44; Bureau of Labor Statistics.

It is difficult to overstate the effect that financing policy has on the demand for allied health personnel. Two types of impact on employment should be highlighted.

First, financing incentives can change the way a health care provider views allied health services. Whereas some services, such as laboratory, were considered revenue producing prior to prospective pricing, they are now perceived as a cost element in the health care product and ripe for management efforts to economize. Alternatively, the way care is reimbursed can create incentives for expansion of a service, to which allied health workers contribute. For example, the ability of a hospital to enter the sports medicine market will depend on its ability to attract physical therapists.

Second, financing policy also affects the ability of individual allied health practitioners to prosper in the health care market. At issue here are fee-for-service reimbursement and direct access to patients without physician referral. Tied to these issues are a set of regulatory concerns, such as scope of practice and supervision by other health professions in licensure laws. Respiratory therapists are seeking to gain direct Medicare reimbursement for home services, so they can move from consideration as home health agency overhead to marketing their own services, not unlike occupational and physical therapists. Likewise, dental hygienists are seeking to gain independence from dentists in their ability to bill for services, a move requiring both licensure and reimbursement accommodation.

Perhaps the most dramatic example of the importance of financing in generating demand for services and personnel is the spread of third party reimbursement in the 1960s which generated increased demand for services, an era of hospital building and technology adoption, and rising employment for health care personnel. More recently, the federal government has established a cost containment measure, the prospective payment system (PPS), which shifts the risk of the cost to the provider.

A number of observers have examined the initial impact of PPS on hospital operations. Length of hospital stay decreased at a faster rate than had been occuring previously (there was a slight upturn in 1986, however), and occupancy has averaged only 66.6 percent since 1983. The proportion of patients with complex problems has increased (Prospective Payment Assessment Commission, 1987). Staffing has been altered as hospitals adapt to these changes. Hospital employment, which had been increasing at a rate of 4.9 percent per year in the six years before PPS, decreased in 1984 and 1985. (2.1 percent and 1.8 percent, respectively,) and increased only slightly (0.4 percent) in 1986 (Prospective Payment Assessment Commission, 1987). Further analysis of staffing shows that the use of part-time employees increased and for many allied health fields there was a shift to higher level employees. It is not clear whether the move to higher skill levels reflects the needs of sicker patients or a perception that a more highly educated employee is a more cost-effective employee. The shift to part-time staffing could be a cost containment effort as well as a move to make flexible staffing easier. For some allied health fields it may reflect difficulty in hiring full-time staff. Or it may signify policies designed to minimize the cost of employee benefits.

The Bureau of Health Professions asked the American Hospital Association to report staffing changes since the introduction of PPS. The following general trends were found:

- increased emphasis on productivity
- heightened demand for employees who can work in more than one functional area, thus decreased interest in professional credentialing that restricts scope of practice
- increased use of part-time employees, contract services, and float pools
- increased competition among professionals
- replacement of personnel by capital
- fewer management positions
- increased retraining and cross-training of personnel (American Hospital Association, 1985).

A small study of 13 Philadelphia hospitals in 1985 provides insight into personnel strategies of institutions adjusting to PPS. Most of the hospitals surveyed had cut their labor force through attrition--primarily in the ranks of less-skilled patient care employees (Appelbaum and Granrose, 1986).

More recent studies of the impact of PPS on hospitals suggest that the downward trend in staffing has turned around. A 1987 national survey of laboratories found that after sharp post-PPS staff and budget cuts, test volume is up, budgets are bigger and staff reductions are abating. In 1986 only 16 percent of labs reported staff increases. A year later 31 percent were reporting staff increases (Gore, 1987).

Another aspect of health care financing--mandated benefits--may also influence utilization. States mandate insurance coverage to improve access to services. In the past two decades, 645 mandated coverage bills have been passed by states (Scandlen, 1987). Currently, coverage is mandated for physical therapists in two states, and speech and hearing therapists in four states (Scandlen and Larsen, 1987); some states mandate coverage of all licensed health practitioners.

Technological Change

The direction of technological change and its impact on allied health employment are difficult to predict. Some changes in health care financing and the structure of the delivery system suggest likely future directions: health care managers appear to be interested in technologies that will improve productivity and lower costs, and technologies that enable providers to establish organizations that fill a special market niche are also likely to be purchased.

Technological change is not only reactive (to factors such as financial incentives) but prospective as well, it drives the type of care provided by delivery systems. For instance; the technology of renal dialysis drove the creation of dialysis centers and practitioners who specialize in treating patients with end-stage renal disease. Technologies also drive the organization of delivery systems. Electronic telemetry equipment, for example, enables patients to be treated in non-traditional settings such as satellite facilities, homes, and vehicles. How technologies yet to come will influence allied health employment is of course not known. Seymour Perry, professor of medicine at Georgetown University and former director of the National Center for Health Care Technology described the following advances at the committee's workshop in April 1987:

— Automation in clinical laboratories will progress, decreasing the complexity of tasks and increasing productivity. It is anticipated that the only category of lab personnel that may be replaced by computers is the least trained. The more highly-trained individuals may actually be in greater demand as computers are added to the laboratory.

— Computer-based technologies will be used increasingly, especially for clinical decision-making, administration, medical records keeping, and patient monitoring.

— Genetic and monoclonal antibody technologies will generate new diagnostic tests. Many monoclonal antibody-based diagnostic tests will be self-administered in the future, and new test reagents will replace more labor intensive tests such as culturing. The early diagnosis and monitoring of tumors permitted by these technologies will change treatment modes and prognoses for cancers.

— Advances in technology will permit more health care to be delivered in outpatient settings. The development of less invasive surgical technologies will spur outpatient surgery. As new generations of laboratory and diagnostic imaging equipment become smaller, more diagnostic procedures will be performed in physicians offices and other nonhospital sites. Other technologies, such as programmable infusion pumps for pain medication or chemotherapy, will shorten hospitalization and allow for home care of patients.

Technological change that emerges from basic science and represent real advances in diagnosis and treatment are likely to be adopted. The effectiveness of technologies is not always initially clear, however, hence there is growing interest in technology assessment. It is also not clear how technological change will impact on manpower, especially in the long run.

New technologies follow various paths, and have differing effects on the demand for allied health personnel. On one path, for example, the new technology initially requires highly-skilled manpower and is of low productivity until it becomes a routine procedure able to be assumed by lower level staff and performed at high volume. In some cases, the test may become automated. This is a path typically taken by laboratory tests. Other technologies may use personnel differently.

The relationship between manpower needs and technological change fluctuates constantly but is seldom explored, making it difficult to assess the future with much certainty. While there is some understanding of the forces that drive technological change, the effect of the change on allied health practitioners has not been adequately researched.

The Supply of Other Health Practitioners

The supply of other health practitioners--doctors, nurses, dentists--influences the demand for allied health services in several ways.

As the supply of physicians continues to grow at a rapid pace (over 50 percent growth is expected between 1980 and 2000), allied health practitioners must ask whether physicians whose practices fail to bring them the desired income will seek to take back functions they had delegated to allied health practitioners in earlier periods. Physicians wonder about this too. One surgeon wrote,

> To abrogate one's responsibility for postoperative care is retrogressive and tends to return to the period of 200 years ago, when the surgeon was simply a technician. I do not believe that only the respiratory therapists can understand the controls of the MA2 or Bear respirators. I do not believe that the surgeon who operates upon the intestinal tract should need an enterostomal therapist to take care of the problems in a patient with an ileostomy. I do not believe that the surgeon who performs a mastectomy should require a physical therapist to assure that the patient has normal arm motion following this operation (Jordan, 1985).

Since the Graduate Medical Education National Advisory Committee (GEMENAC) made its prediction in the 1970s of a surplus of 70,000 physicians by 1990, there has been considerable debate in the literature about whether these numbers are in excess of an "optimal" level and, if there is indeed an excess of physicians, what that could mean for the health care system. GEMENAC concluded that non-physician providers (that is, physician assistants, nurse practitioners, and nurse-midwives) may substitute for physician services and thus aggravate the physician surplus (GEMENAC, 1980). Some allied health leaders have been concerned that this conclusion has been generalized inappropriately to all allied fields.

For physicians to assume what are now considered allied health services, at least three conditions must be satisfied:

(1) Physicians must be willing to once again take on tasks that the medical profession forwent because these tasks were considered repetitive or unchallenging.

(2) Physicians must be competent to perform the tasks. While in theory the license of medical doctor (M.D.) permits the physician to perform most tasks of allied health practitioners, in many cases their training has not prepared them to function effectively or productively in the full range of services of many of the allied health fields.

(3) Payers and managers must be willing to recompense the substitution. The decision to substitute physician time for the time of the allied health practitioner must make economic sense to the physician or the organization that employs the physician. In a physician's office this implies that physician time is so underutilized that it is preferable that a physician do the tasks than an allied health practitioner be paid to do them. In an organization like an HMO that employs physicians, it means that physician and allied health salaries are so nearly equal that allied health practitioners are not worth employing because of their more limited scope of practice and sometimes more limited patient appeal.

Competition between physicians and allied health practitioners is most likely to occur when allied health practitioners are increasing their autonomy. For example, although offering the same service, physical therapists, physicians, and chiropractors in some sense can be viewed as competing for the first contact with patients having musculoskeletal pain symptoms. The American Physical Therapy Association views competition in the following light:

> Members of the American Physical Therapy Association are actively seeking legislative removal of the requirement for referral, that is, legislative provision for direct access to their services, and have succeeded to date in 14 states (evaluation with referral is permitted in another 22 states). This is an effort toward independence in practice that does not put the physical therapist in direct competition with the physician, and may, in fact,

> increase referrals to physicians in appropriate circumstances. This is not to say that competition is lacking between physical therapists and physicians. Such competition as does exist between these two practitioners is competition between their businesses, not between the services that each personally provides to patients. In recent years, physicians have increasingly employed physical therapists in their businesses and compete directly with the businesses of self-employed physical therapists and, in some instances, with the businesses of hospitals which have a variety of out-patient and "outreach" physical therapy units (American Physical Therapy Association, 1987).

Medical technologists who are attempting to move more forcefully into roles as directors of full-service laboratories are raising issues of "arbitrary barriers" imposed by facility accreditation standards. Competition may come from physicians who are reportedly eying a greater involvement in the laboratory business, and, to the extent that physician office laboratories substitute for other testing sites, the use of medical assistants and on-the-job trained personnel to run office laboratory equipment may be seen as a form of physician substitution and competition.

Anecdotally, there appears to be growing competition and turf disputes between nurses and allied health personnel. At the committee's public hearing, the Association of Surgical Technologists spoke about their controversy over operating room turf and whether they or nurses will perform certain functions. The future of nurse-allied health practitioner confrontations will in part be determined by the supply of nurses and whether managers will begin to limit the breadth of nursing duties. On the other hand, nursing appears to be moving up the ranks of faculty leadership into higher levels of decision-making regarding whether nurses or others will perform certain roles.

Counterbalancing possible direct competition from physicians due to their growing numbers is the positive effect of the volume of work generated by their increased supply. While utilization management techniques are geared to controlling unnecessary use, it is unclear how effective these tools will be in reducing the volume of ancillary services and how this in turn will affect allied health employment. Moreover, the continuing spectre of malpractice mitigates against vigorous efforts to control testing. A far-reaching response to physicians protecting themselves against liability by practicing defensive medicine does not appear imminent.

The net effect of the increasing physician supply weighs more heavily toward increasing than decreasing the services delivered by allied health personnel. That is not to say that turf issues between allied health practitioners and others will lessen, but it appears that demand will not be unfavorably affected.

Forces that Drive the Supply of Allied Health Practitioners

The discussion thus far in the chapter has focused on factors driving demand for allied health practitioners. In this section, we turn to forces that shape the supply of allied health practitioners.

The U.S. Labor Force

The future availability of allied health workers cannot be divorced from larger trends in the U.S. labor force. The labor force is growing more slowly than in the past and the participation rates of various groups of people is changing. The labor force is becoming older, more female, and includes more racial and ethnic minorities than in the past (see Table 3.3). (The following discussion of the labor force is based on data in Saunders, 1987).

The number of women in the labor force will increase at more than twice the pace the number of men, and women will constitute nearly half the labor force in the year 2000. They will make up 63 percent of the additional workers filling new jobs. The number of men and women of prime working age--that is, between 25 and 54 years old--will be the most rapidly increasing group, while the number of younger workers will decline. The proportion of workers of prime working age will increase from 67.5 percent in 1986 to 72.6 percent in the year 2000. The number of black workers will increase twice as fast as the number of white workers, Asian workers five times as fast, and Hispanic workers more than five times as fast. Hispanic workers will make up 29 percent of the workers entering the labor market between 1986 and 2000; other minority groups combined will make up another 29 percent.

The economy will be more dependent upon women workers (who have always been prominent in the allied health professions) and upon minority workers.

Trends in College Enrollment

In the majority of the allied health occupations, graduation from four-year or two-year college programs is the way workers qualify for employment. We therefore have to examine trends in higher education enrollments and graduations as a first step in appraising the potential labor supply of allied health personnel. The following assessment utilizes data from the Census Bureau's Current Population Reports and data developed by the U.S. Department of Education's National Center for Education Statistics (Center for Education Statistics, 1988; Center for Education Statistics, 1987; Center for Education Statistics, 1970-1987; National Center for Education Statistics, 1985).

The population of college age—18 to 24 years—is declining due to a decrease in births two decades ago. After peaking in 1981, the college-age population dropped by eight percent by 1986, and is expected to continue declining through 1996 when it will be 23 percent below the 1980 peak. The number of college-age people will then begin to rise, and by the year 2000 will be six percent above the 1996 low point but still 19 percent lower than 1980, and about 12 percent lower than 1986 (see Figure 2). This constriction in the flow of new workers into the labor force will affect all occupations. Whether it will affect the professions and other occupations requiring college education as much as it will affect those occupations not requiring college education depends on whether college attendance drops as much as does the population. College enrollments and graduations will maintain their current levels, or increase, only if a higher proportion of youths go to college.

The allied health fields are composed primarily of women. There are a few fields—emergency medical services for example—in which women are a small minority; and a few others, such as respiratory therapy, in which the share of men and women in the workforce is roughly equal. For the most part, however, women predominate. For this reason, we focus on women's college participation rates and on the trends in women's choices of fields of study.

The number of women receiving bachelor degrees increased steadily between 1970 and 1986, reaching 502,000 in the latter year (47 percent more than in 1970), as a rising proportion of women of college age completed college.

The Center for Education Statistics (CES) projects a further increase in the number of women earning bachelor degrees, peaking at 512,000 by 1989, followed by a slow decline through the year 2000 to 470,000 graduates—about 6 percent below the 1986 level. Since the population of college age is expected to be 12 percent below the 1986 level by the year 2000, this the projection of women graduates assumes that the proportion of women completing college will continue to increase.

TABLE 3.3: Changes in the Labor Force between 1986 and 2000 (projected), by Age, Sex, and Race.

	Percent Change 1986-2000	Percent Distribution 1986	2000
Total, 16 and over	17.8	100.0	100.0
Men, 16 and over	11.8	55.5	52.7
16-24	-6.1	10.4	8.3
25-54	19.4	37.7	38.2
55 and over	-1.8	7.4	6.2
Women, 16 and over	25.2	44.5	47.3
16-24	0.1	9.4	8.0
25-54	35.8	29.8	34.4
55 and over	10.1	5.2	4.9
Race			
White, 16 and over	14.6	86.4	84.1
Black, 16 and over	28.8	10.8	11.8
Asian and other, 16 and over	71.2	2.8	4.1
Ethnicity			
Hispanic, 16 and over	74.4	6.9	10.2

SOURCE: Fullerton, H. N. Jr. 1987. Labor Force Projections: 1986-2000. Monthly Labor Review. Vol. 110, No.9 (September).

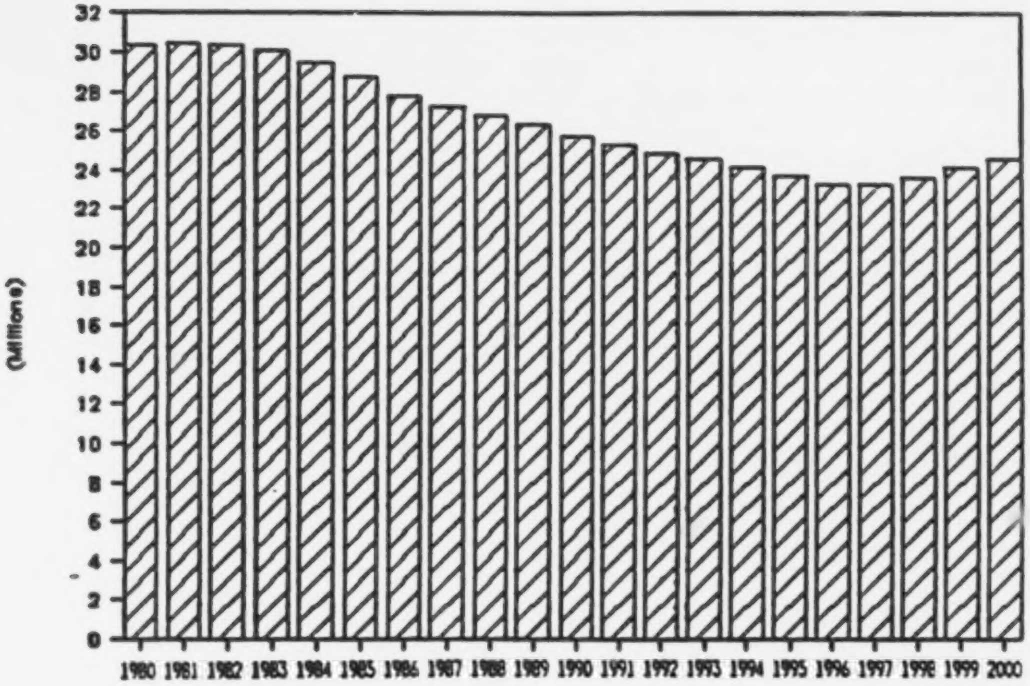
Since these CES projections were made, that office has released preliminary data for 1987 (based on a sample of colleges). These data indicate an increase in the number of graduates between 1986 and 1987 instead of the decrease that had been projected. The preliminary estimate of women bachelors degree graduates for 1987 was 512,000—two percent above the 1986 figure instead of the one percent drop projected. This may mean that the rising trend in the proportion of women completing college is continuing even more strongly than projected.

Graduations from programs that require fewer than four years of study increased more rapidly than all other awards granted by institutions of higher education from 1975 to 1985. Associate degrees increased by 26 percent. Whereas the increase in men earning associate degrees was only six percent, almost 50 percent more women earned associate degrees in 1985 than had a decade earlier. Other less than four year degrees increased by 45 percent between 1975 and 1985.

The number of associate degrees awarded fell between 1985 and 1986 and is projected to continue falling through 1996 when the number of graduates will be about 11 percent fewer than in 1985. The Center for Education Statistics does not make sex-specific projections for associate degrees, but if current trends in men's and women's relative share of earned degrees continue, then we may expect that the decrease in women associate degree graduates will be less than 11 percent. The number of associate degree graduates is expected to resume its upward climb in 1997, but in the year 2000 will still be eight percent below the 1985 level.

Figure 2

College-Age Population, Ages 18 to 24 Years
(Actual 1980-1982; Projected 1983-2000)



SOURCE: US Department of Commerce, Bureau of the Census, Current Population Reports, "Population Estimates and Projections," Series P-25.

The Center for Education Statistics' 1972, 1977, 1982 and preliminary 1986 data show no trend towards increased college enrollment among the 25-44 year old age group.

Trends in Women's Choices of Fields of Study

The proportion of women baccalaureate graduates who chose health fields (allied health, health sciences, and nursing) has increased over the past decade and a half. In 1970, slightly less than five percent of women with the bachelor degree chose these fields. This increased to about 11.5 percent in 1980, declining to just below 11 percent in 1986. Thus, at a time when the numbers of women bachelor degree graduates were increasing, the health fields nearly doubled their share of that rising total. The fields of business and management, communication and communication technologies, computer sciences, and engineering, together, did even better. Their share of women graduates increased from less than three percent in 1970 to more than 32 percent in 1986—a more than eleven-fold increase. The gains in the fields of health, business, and communication were at the expense of education. Education's share of women graduates declined from about 36 percent in 1970 to 13 percent in 1986, indicating a major change in women's career goals. The fields of psychology and social sciences attracted gradually declining shares over the 16-year period, falling from 21 percent to 14 percent (see Figure 3).

Among women earning associate degrees between 1983 and 1985, business and management was also the top ranking field, followed by health sciences. For men, health sciences was not among the three top-ranking fields during these years.

Trends in the choice of study area within the health fields provide additional information for use in appraising the potential labor supply of allied health personnel.

Nursing still accounts for almost 60 percent of women's bachelor degrees conferred in health, although this figure has fallen slightly since 1970. (see Figure 4). Hospital and health care administration, once the domain of men, has become increasingly attractive to women. For physical therapy, occupational therapy, and speech-language pathology and audiology, fields that require at least a bachelor degree for entry, the number of graduates has grown over the years but their relative shares of health degrees have remained constant. Nursing also dominates the awards requiring less than four years of study, accounting for about 52 percent of helath sciences degrees in recent years.

For some fields, colleges are not the primary sponsors of educational programs accredited by the Committee on Allied Health Education and Accreditation (CAHEA). Programs in radiography, for example, are found primarily in hospitals rather than in educational institutions. Hence, the CES data cited, which includes only degrees and awards granted by institutions of higher education, does not encompass all allied health program graduates. However, the impact of non-college education programs on the validity of the trends portrayed by the CES data is marginal. Although non-college sponsors accounted for 40 percent of all CAHEA-accredited programs in 1986, they accounted for only 33 percent of the graduates during the 1985-86 academic year.

One of the factors influencing career choice is the students' perception of employment opportunities. The Bureau of Labor Statistics expects the number of jobs in some of the fields that are popular with women to grow more slowly than the allied health fields in the coming years. These fields include: teaching, psychology, social work, and, surprisingly, most of the business executive occupations. Accounting and nursing are expected to grow at roughly the same rate as allied health fields. Employment in a few fields, including computer sciences, is projected to grow at a faster rate than employment in the allied health fields. To the extent that these expectations affect students' choices of careers, the allied health fields may be able to hold their own or even gain a larger share of women college graduates. Since the number of women college graduates are projected to remain close to current levels or decline only slightly over the next 12 years, the supply of graduates in allied health may remain close to current levels through the year 2000, despite the decline in the college-age population.

Education Financing

A commonly cited maxim among allied health leaders relates to the position of allied health in the pecking order of health professions education programs: "allied health fields are the last to be funded in good times, first to be cut when resources are reduced." This statement reflects the importance of the economic climate in which higher education resource allocation takes place and how decisions about allied education resources are related to some broader financing trends. Education financing, the efficiency of education programs, and higher education's perceived contribution to society all impact on the longevity of allied health education programs and future supply of allied health personnel.

Overall, national higher education expenditures in the past 10 years have grown. Between 1973-74 and 1983-84 current funds expenditures, adjusted for inflation, increased 23 percent for public institutions and 31 percent for private institutions. Much of that growth came in the mid-1970s. Public college spending in the latter half of the ten-year period grew by only 5 percent, and private college spending by 13 percent (Center for Education Statistics, 1986).

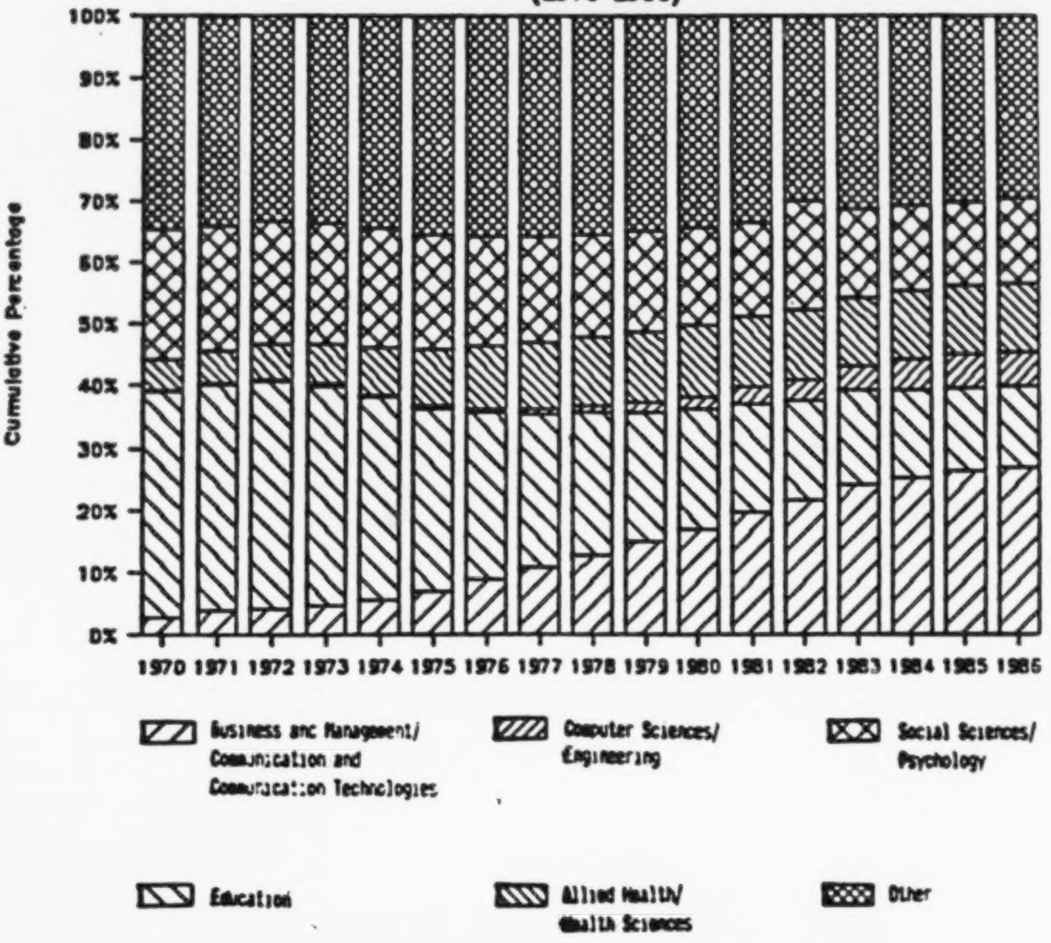
There were shifts in revenue sources between 1973 and 1983. For public institutions the federal share of total revenue decreased from 12.8 percent to 10.5 percent; the state share remained relatively stable. For private colleges, the percent of total revenue attributable to federal sources rose from —— to 19.4 percent by the mid-period but dipped to 15.7

Figure 3

The Relative Shares of Some Major Fields of Study

Among Women Earning Bachelor Degrees

(1970-1986)



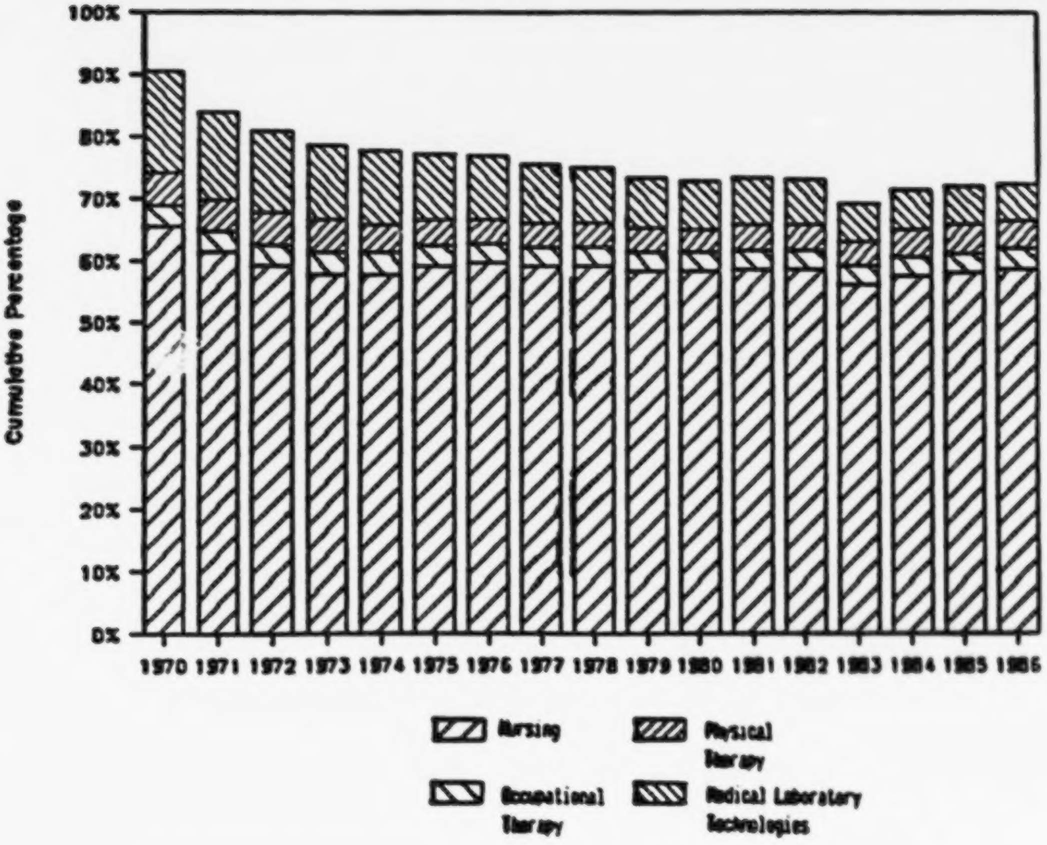
SOURCE: Digest of Education Statistics, several years.

Figure 4

The Relative Shares of Some Selected Health Fields

Among Women Baccalaureates in Allied Health and Health Sciences

(1970-1986)



SOURCE: Digest of Education Statistics, several years.

percent by 1983-84. State and local appropriations were relatively low and declined slightly over the ten-year period—from 3.2 percent to 2.5 percent. Both public and private institutions that own hospitals have seen increasing revenues from their hospitals—from 5.1 percent to 7.4 percent for public colleges, and from 8.7 percent to 10.1 percent for private. Private institutions rely more heavily on tuition than do public schools, 39 percent compared to 15 percent, but the contribution of tuition is increasing in both types of schools (Center for Education Statistics, 1987).

Although they fare better than most arts and science programs in garnering external funding, allied health programs are nonetheless relative newcomers to academia. As federal support has diminished, allied health program administrators are pessemistic about their place in higher education institutions relative to traditional departments such as history and mathematics, and to professional programs such as engineering, medicine, and business administration.

Federal funds stimulating allied health education program development peaked in 1974 at nearly $30 million and diminished substantially thereafter. No data are available on aggregate allied health education expenditures, but much of the cost is borne by state and local government expenditure and by tuition support in private institutions. The key driving forces behind allied health education financing are state and local appropriations, student demand, and the availability of clinical facilities and teaching staff. Allied health education programs are vulnerable in each of these areas. (See Chapter 5.)

Although there is variability among states in the generosity of education funding, cutbacks often means that allied health programs, because they are perceived to be expensive, are especially vulnerable. For some allied health fields this is compounded by falling student enrollments. Unlike other types of curricula, allied health education is dependent on clinical facilities for teaching resources, and is therefore affected by health care financing policy as well as higher education budgets.

State legislators and higher education officials, faced with difficult resource allocation decisions, are seeking ways to assure greater accountability from collegiate institutions. A Michigan commission on the future of higher education in that state recommended various measures to attain a "stronger, leaner, more efficient system" to save on capital and operating costs. These measures focus on the review of "non-core" and "low-degree producing" undergraduate progams, health care profession programs, high-costs programs, and programs with excess capacity due to their geographic location (McKinney, 1986).

State officials are also paying close attention to the products of the higher education system and its impact on local economic development. Respondents to a 50-state survey revealed that formal assessment of student and institutional performance is a growing phenomenon and is likely to intensify in the years ahead. Among the broad array of activities evaluated by outcome assessment are graduates' employment experiences, their evaluations of the education they received, employer hiring patterns and former students' job performance. Counterbalancing this job orientation is a growing concern that technically trained individuals be creative, have the capacity for civic responsibility, and receive a liberal education. Specialized accrediting bodies for the professions are the targets of exhortation to foster curricula that include general education in humanities, arts, and the social sciences (Boyer et al., 1987).

While most allied health programs report good initial job opportunities for their graduates, this advantage in outcome assessment is balanced against the liabilities of unfilled student spaces, the need for expensive equipment and high faculty/student ratios, and an image in some academic settings as lacking in scholarly attributes.

Other Forces Influencing Supply

Unions We noted earlier that the allied health fields' ability to attract students depends in part on the attractiveness of allied health occupations relative to other occupations open to women. The ease with which one will be hired and expected earnings are both facets of the perceived attractiveness of an occupation. One factor that affects both earnings and the kind of life an occupation offers is the extent to which unions are present and active.

In many occupations unions are a factor in determining demand and supply. Demand is affected by collective bargaining agreements concerning such issues as the length of the working day, tasks that may be performed, and compensation. Supply is affected by altered pay, benefits, working hours, jobs security, and other factors that make an occupation more or less attractive to workers.

In recent years, unions have viewed health care, with its many unorganized workers, as a major opportunity for expansion. In the past the unionization movement has not had much success with health care workers. Its limited success has been in the public sector, and then only in some areas of the nation. This has recently changed, however. While union activity in the private sector as a whole declined from 23 percent to 18 percent between 1980 and 1985, union membership among health care workers increased by 6 percent to about 20 percent of the health care workforce (American Hospital Association, 1986). In general, allied health occupations appear to be covered less frequently by labor-management contracts than are nurses, for example. In private hospitals in 23 metropolitan areas, 26 percent of nurses were covered, compared with between 5 and 12 percent of occupational, speech, and physical therapists, medical record administrators, and dieticians. Approximately 20 percent of medical laboratory technicians were covered, and 16 percent of radiographers (American Hospital Association, 1986).

Although unions have not become major factor in many allied health fields, service workers have become, with some success, the focus of much union activity. The swing away from the direct economic considerations that nursing unions are exhibiting may provide some clues about the concerns of other health workers and suggest what may be done to make employment more attractive.

Malpractice Litigation The supply of allied health practitioners in some fields is also vulnerable to the impact of malpractice litigation. Since the late 1960s the number of medical malpractice claims and the size of jury awards has soared. By the mid-1970s physicians in some states were having difficulty purchasing malpractice insurance as some insurers withdrew from the market, and some physicians could not buy insurance at any price. For all physicians the average cost of insurance increased by 81 percent between 1982 and 1985 (Health Care Financing Administration, 1987b). Malpractice litigation raises questions about quality, liability, and other issues. The experiences of physicians suggests how the supply of some allied health practitioners could potentially be affected by malpractice litigation and insurance. Twenty-one percent of respondents to a 1984 survey by the American Academy of Family Physicians reported that they had restricted their obstetrics practice because of high premium costs. Thirty-five percent of respondents to a survey by the American College of Obstretricians and Gynocologists said that they had responded to professional liability risks by altering their practice—often reducing or eliminating the obstetrical component, or cutting out care for high risk pregnancies (Health and Human Services, 1987).

The supply of allied health practitioners whose autonomy of practice is limited is unlikely to be affected by malpractice considerations. But for some allied health fields this could, in the future, become an important issue. The extent of physician supervision of an allied health practitioner's work can determine the practitioners legal responsibilities. For example, if a physical therapist is the primary manager of a patient, the therapist is responsible for assuming that appropriate informed consent procedures are followed (Banja and Wolf, 1987). A case brought against an audiologist reveals the vulnerability of practitioners to malpractice litigation even when the possibility of harm seems remote. In this case an audiologist's failure to diagnose deafness in a child was claimed to have damaged a child born subsequently to the parents who, since it has not been diagnosed, were not informed of the inheritability of the defect (Supreme Court of California, 1982).

How the physician supply has been affected by malpractice issues can be studied by those concerned with the future supply of allied health pactitioners. If practitioners successfully push toward modes of practice in which supervision diminishes and autonomy increases, malpractice litigation and the cost of insurance could eventually constrain the supply of practitioners willing to endure the stress of threats of litigation, and with the resources to pay high premiums.

Alternative Patterns for Development of Health Services: Three Scenarios

It is obvious from the discussion thus far that there are many forces that may be impacting on health services delivery and the demand for and supply of allied health personnel. It is virtually impossible to take all the elements of all these forces into account when trying to evaluate the future for any single allied health field. The committee considered ways of thinking of alternative assumptions about the major factors that influence employment in the health industry. It believes that looking at a limited number of alternative broad scenarios is a useful tool for decision makers trying to evaluate the future of specific allied health professions.

The Bureau of Labor Statistics (BLS) makes employment projections based on macroeconomic factors—trade balance, employment rate, productivity, and overall demand (see Appendix V). Although demand for health services and allied health practitioners is related to macroeconomic growth, there are other forces at work that may operate independently of the macroeconomic factors and in some cases overwhelm them. Thus, the committee offers three simple scenarios driven by the single force most likely to determine the size and direction of change in health care services—health care financing. Unfolding events can be looked at in the context of these scenarios. Decision-makers concerned with balancing supply and demand can apply the scenarios in estimating the demand side of the equation.

The three scenarios are driven by health care financing for two reasons. First, financing is the major force driving technology, the structure of the industry, and other determinants of allied health demand. And second, health care financing responds, through public and private policy decisions, to other important influences such as the economy, demographics, disease patterns, and social values. Thus, financing responds to some important determinants of demand, and drives others.

Scenario One: Mixed Model

The mixed model assumes a continuation of the existing mixture of methods of payment. Some services, both inpatient and outpatient, will be paid on a prospective basis (either capitation, diagnosis, or some other unit of payment), and some on a retrospective fee-for-service basis. Within the fee for service sector, some payers will negotiate rates with providers, while some payers will pay on the basis of customary and reasonable charges. First-dollar coverage will be less usual than the use of co-payments and deductibles as utilization controls.

The proportion of the population in managed care systems will grow steadily from today's approximately 10 percent.

It is assumed that hospital utilization by younger patients will continue to drop, but upward pressure from the aging population will overwhelm the downward trend causing overall hospital admissions to rise slowly. Intensity of care will continue to increase, with greater selectivity in hospitalizing young people and increasing admissions of older patients with complex problems. Hospitals will continue their vertical integration as they seek to retain their share of the market. Non-inpatient services increase in free-standing centers, the home, hospices, hospital outpatient departments, etc. Some long-term care will take place at home, but modest expansion in the supply of nursing home beds will allow nursing homes to continue as the chief long-term care institutional site. However, efforts will be made to moderate the growth of nursing home beds to contain costs.

Technologies that appear to be cost-effective will be adopted and diffused into the health care system. Technologies that promise to improve outcomes will also be sought, as will advances that allow procedures to be done on an outpatient basis.

Scenario Two: Prospective Payment

This scenario assumes that prospective payment becomes the dominant payment mechanism. Not only hospital care, but most other sorts of care will be paid on a prospective basis. Generally, payment will be at a preset, negotiated level, made on a capitated or diagnosis basis. HMOs will gain a substantial share of the market. Insurance companies will own and run HMOs and PPOs. Indemnity insurance will be expensive and infrequently used. Large employer organizations become sophisticated bargainers that successfully control health benefits' costs through negotiations with insurance companies and HMOs. Those organizations will bear risk and must exercise strict utilization control, case management, and negotiate payments to ensure their profits. The number of salaried physicians will increase substantially.

Hospital utilization will be effected by the growth of HMOs and other managed care systems that are successful in controlling admissions. Although the upward pressures of the aging population is felt this will not be sufficient to prevent a small drop in overall hospital utilization. Hospitalized patients will be more seriously ill so care is more complex. Within the hospital there is a heavy emphasis on employee productivity and ensuring that unnecessary or ineffective services are eliminated.

Outpatient, and other cost restraining delivery styles will increase rapidly in this scenario. Physicians not in managed care systems will broaden the scope of their practices, supplying an increasing range of services. All existing outpatient services burgeon, and new ones will be added as technology and entrepreneurial providers take advantage of opportunities.

Technologies seen to be cost effective will be eagerly sought. Other technologies are viewed more skeptically. Increased emphasis on ensuring effective care will encourage increased technology assessment. The results of such research will be rapidly adopted.

Scenario Three: Access

In this scenario policy decisions are made that attempt to ensure access to care for all in need. This can be achieved by a number of mechanisms used singly or together. It could be done by a scheme of national health insurance which might incorporate mechanisms of cost control. It could be done by expanding public programs, expanding mandated insurance benefits, ensuring payment to providers who care for unsponsored patients, requiring all employers to provide adequate health insurance benefits, and by catastrophic insurance for those with incomplete coverage. Developing an adequate "safety net" would halt the cost shift to other payers which is one way uncompensated care is supported today. This scenario is not an alternative to the first two scenarios, but could occur in tandem with either.

It is assumed that whatever funding arrangements are made, they will encourage individuals who would have postponed "elective" procedures in the absence of third party payment to seek care in a timely fashion rather than delay seeking care until becoming seriously ill. Thus the intensity and complexity of inpatient care will decrease marginally. It is also assumed that funding will made available for health promotion and disease prevention services that are thought to decrease total health care costs.

In Chapter 4 we show how the scenarios would affect demand for practitioners in each of ten allied health fields.

Conclusion

This chapter described factors that drive demand in the health fields—including aspects of population and economic growth and changes in financing and the structure of the health industry. It also looked at forces that may affect supply of health care workers—growth of the U.S. labor force and the college age population and trends in female students' choices of study field, for example. Three health care financing-driven scenarios which decision makers may find useful tools in trying to evaluate the future of specific allied health professions were presented.

Educators, employers, and others are faced with difficult investment decisions in planning for future human resource needs. They must make their best guesses about forces driving the demand and supply of workers—their magnitude, the directions they may take, and their interactions. The answers are not always obvious. There is no certainty as to how many AIDS patients will require and receive physical therapy services, for example, or whether sonograms will be routinely used to screen for cancer. Despite the uncertainty, it is possible to learn more about how these forces influence allied health employment and the supply of workers. One, for example, may track disease and treatment patterns and how allied health practitioners are used, or may identify new technologies and determine their likely impact on allied health services.

Monitoring key driving forces permits useful insight into the future and allows one to better determine policy actions.

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CHAPTER 4

DEMAND AND SUPPLY FOR TEN ALLIED HEALTH FIELDS

Major economic demographic and social forces must be taken into account in assessing the directions and magnitude of changes in the health care system and their implications for allied health employment. This chapter examines how each of 10 allied health fields is affected by these forces and how they will determine the demand and supply for each field by the year 2000.

The discussion deals with national trends, even though local decision makers concerned with allied health practitioners may observe conditions that differ substantially from the national experience. The committee believes that its national analysis will be helpful to those who must draw conclusions about the future of allied health personnel in their own locality.

The committee's assessment of the future is based on several types of information. BLS projections of demand are the source of quantified demand information. To draw conclusions about demand, the committee incorporated its own judgements about the impact of the many forces that drive demand. Assessments of supply were made based on what would happen if the situation remains unchanged with respect to the rates with which individuals leave and enter the allied health workforce. To that were added assessments of the likelihood of the situation remaining unchanged. A final element in trying to foresee the future is application of the limited knowledge of current supply and demand balances. Because decision makers must even in the absence of complete data, the committee decided to make assessments of future labor markets for allied health practitioners. To do this BLS data was used. Chapter 2 described the BLS data collection and projection process. The committee advises readers to view the projections critically, in the light of their inherent limitations. The projection should be interperted not as a precise prediction of the future, but rather as indicating the magnitude of change. This can be used as a basis from which local and federal decisions makers can develop their own best estimates of the labor market. The committee emphasizes the importance of data collection to enable more precise projections to be made.

The committee's assessment shows large discrepancies between supply and demand for allied health practitioners in some fields. But, the committee is not suggesting that these gaps will necessarily occur.

Rather, the market will eventually adjust so that over time a reasonable balance is achieved. If employers are sufficiently hard pressed they will raise salaries, which will attract more people into the careers. Employers whose ability to pass on costs is increasingly limited by prospective payment, will also try to increase productivity and reduce the number of employees as they become more expensive.

The committee is concerned that the market response will not be quick or creative enough to avoid some negative consequences such as erosion of quality of care, service disruptions and constraints on providers' ability to make timely investments in new modes of service. Because these are serious consequences, the committee believes that it is important to try to anticipate well enough in advance to forestall these disruptions if possible. Later chapters in this report are devoted to examining ways in which health care provider and educational institutions can act to protect themselves, and ultimately patients, from the costs associated with imperfectly working markets.

The comments we make about the way the year 2000 will look do not allow for major changes in the way health care is paid for. If a major financing change does occur, the future of many allied health fields will be significantly altered. To show the nature of the impact of financing changes we apply the scenarios presented in Chapter 3 to each of the ten allied health fields discussed in this chapter.

In assessing the future demand for each of the occupations, we have assumed that the current mix of fee-for-service and prospective payment (mixed scenario) will prevail for the next 12 years. However, as health care policy decisions are taken both at the national and local levels, planners must adjust their views of future allied health employment. To assist in this we have indicated how each profession might be affected by incentives characteristic of the scenarios of "access" (which could include new state Medicaid entitlements or a nationally mandated benefits program) or the "prospective payment" scenario (which could include a new state hospital rate commission or the extension of PPS to settings other than acute care hospitals).

We also alert readers to the significant trends in factors influencing supply—most often number of graduates and educational programs. However, labor force behavior is equally important. Unfortunately, since only crude data exist on entrance and exit from the allied health labor force, we were able to make only very rough estimates of future supply. What we do know is that even small changes in tenure in the work force make large differences in the future supply.

Clinical Laboratory Technologists and Technicians

Demand for Medical Laboratory Technologists and Technicians

The BLS predicts that between 1986 and the year 2000 the number of clinical and medical laboratory jobs for technologists and technicians will grow from 239,400 to 296,300, an increase of 24 percent. Although the growth rate is below that forecast for many other allied health occupations, it represents a substantial number (57,000) of new jobs. By comparison, the expected dramatic 87 percent increase of physical therapist jobs represents only 54,000 new jobs. It must be remembered that the BLS data are based on employers' responses to questions about the numbers of people performing defined tasks. Respondents are not asked to distinguish licensed or certified personnel from those without such credentials.

Clinical laboratories are in a period of rapid change. Technological changes are enabling tests to be conducted in new settings, and are generating new tests. PPS has caused hospital managers to rethink the relative roles of in-house and reference laboratories. Changes in reimbursement have caused physicians to seek the benefits of providing office laboratory services. New settings for health care, such as ambulatory centers, are establishing laboratories in non-traditional settings.

When analyzing these changes in terms of their impact on demand for technologists and technicians, it is important to distinguish between changes reducing demand, changes increasing demand, and changes that make no difference to manpower but only represent a change in location, techniques, or practice style.

Since approximately 63 percent of clinical laboratory technicians and technologists are employed by hospitals (see Table 4.1), changes in that setting will have great influence on the demand for those personnel and on where they work. A number of factors that are affecting the hospital laboratory workload may, in turn, affect personnel needs.

The introduction of PPS, the resultant reduction in occupancy rates, the incentives to provide less costly care, all affect hospital laboratories in several ways. Many hospitals have increased their use of reference laboratories for specialized tests, concentrating in-house laboratory work on widely used tests with which economies of scale can be achieved. Simultaneously much preadmission testing is done on an outpatient basis, and inpatient test mix has changed as more complex cases are admitted. According to the American Hospital Association, full-time-equivalent (FTE) employment in U.S. registered hospitals fell between 1983 and 1986, with medical technologist employment falling by 2.4 percent. FTE employment of other laboratory personnel fell by 5.3 percent between 1983 and 1985, and rose by 2.1 percent in 1987 (American Hospital Association, 1985 and 1987). A survey of the early impact of Diagnosis Related Groups (DRGs) on 122 hospital laboratories noted that 63 percent of hospitals experienced increased test volume in 1983. This had fallen to 32 percent of hospitals in 1984.

The number of hospitals experiencing decreased volume almost doubled from 24 percent in 1983 to 44 percent in 1984. The impact on staffing was observable. Fifty seven percent of laboratories reduced employment after PPS—only four percent increased employment (Medical Laboratory Observer, 1984). These early changes reducing demand did not continue. Utilization and budgets are growing bigger and staff reductions have abated (Gore, 1987). Since hospital census is thought to be a less reliable laboratory workload predictor than the severity of patient illness (Harper, 1984) one must look to the patient mix for explanation. With an aging population severity of illness is rising. Although the number of lab items per discharge had fallen substantially during the early years of PPS, it rose 19.8 percent in 1985. Possible reasons for the upturn include increased case complexity, less opportunity to shift to outpatient settings and less opportunity for eliminating unnecessary services (Prospective Payment Assessment Commission, 1987).

Medicare is not the only payer trying to reduce laboratory work. Other payers are becoming increasingly conscious of laboratory costs. For example in 1987 Blue Cross and Blue Shield issued Diagnostic Testing Guidelines for appropriate use of 13 laboratory tests. Some of these tests are routine hospital admission or pre-operative tests. While these guidelines were not associated with coverage rules, the recommendations are expected to be adopted by most of the plans, and possibly by other insurers (Abramowitz, 1987). Efforts like that of the Blues may herald a move from exhaustive testing to more targeted use of laboratory work.

Technological change affects clinical laboratories in all settings. While there is discussion of automation in the laboratory—even robotics—reducing personnel needs or lowering the needed skill level, there is potentially offsetting concomitant development of new and complex, labor-intensive, non-automated tests.

Technological changes together with financial incentives and patients' desires have stimulated physicians to make laboratory services available in their offices. Several surveys have been conducted of the extent of this practice. Estimates of the number of physician office laboratories range from approximately 80,000 to over 250,000 (American Society for Medical Technology, 1986). BLS estimates that 30,100 technologist and technician jobs exist in physicians' offices. This is expected to rise to over 46,200 in 2000. Observers close to the scene perceive diminishing enthusiasm for small physician office laboratories, possibly because they are not proving to be cost effective, and possibly because of expectations of increased regulation to control quality.

Two important questions for laboratory manpower demand emerge from the physician office laboratory phenomenon. One is whether physician office tests are additional tests or substitutes for testing at other sites. Another is whether physicians employ clinical laboratory technologists or technicians. No evidence exists to answer the first of these questions. On the question of staffing, a literature review concluded that personnel other than technicians and technologists are more

TABLE 4.1: Medical and Clinical Laboratory Technologists' and Technicians' Major Places of Wage and Salary Employment, 1986 and 2000 Projected

	Number of Jobs 1986	Percent[1]	Number of Jobs 2000	Percent[1]
Total Employment[2]	239,400		296,300	
Total Wage & Salary Employment	238,400	100.0	295,200	100.0
Hospitals, public and private	149,800	62.8	160,000	54.2
Offices of physicians	30,100	12.6	46,200	15.7
Offices of dentists and other health practitioners	890	0.4	1,800	0.6
Medical and dental laboratories	28,100	11.8	43,200	14.7
Outpatient care facilities	5,300	2.2	13,000	4.4

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics. 1987. "Employment by occupation and industry, 1986 and projected 2000 alternatives." Moderate alternative. (Unpublished.)

[1] Percentages were calculated using unrounded figures and will therefore not be identical to percentages that may be calculated using the rounded figures provided above.

[2] Total Employment = wage and salary employment + self employment. Includes 1,000 self-employed workers in 1986 and 1,027 in 2000 who are not allocated by industry.

likely to do laboratory work in small or solo practices. Often nurses are used. The larger the practice the more likely that trained laboratory personnel are employed. One study found over 50 percent of group practices employed medical technologists (Frost and Sullivan, 1985). However, changes in the staffing of physician office laboratories may be on the way. Congress has enacted provisions that will require office laboratories that perform more than 5,000 tests on their own patients to conform to the Medicare conditions of participation set for independent laboratories. This is scheduled to become effective in 1990 (ASMT Today, 1988). Technologists in independent practice are finding increasing opportunities as consultants to physicians who need help with calibration, quality control, test interpretation, more sophisticated procedures, and management of their office laboratories.

Other new sites for laboratory work include HMOs and ambulatory care centers. Although 5,500 such centers are projected to exist by 1990, not all will employ highly trained lab personnel. At small centers, nurses and x-ray technicians often perform routine tests, with cross training conducted by the facility owner (Baranowski, 1985).

The development of HMO laboratories is providing employment opportunities in a new setting, but this employment site should not be thought of as increasing demand for personnel. Indeed, in the long run, as HMOs in competitive environments start to seek new ways to control costs, it is reasonable to speculate that a reduction in demand for laboratory work may be brought about by curtailing superfluous testing.

Future demand for clinical laboratory personnel has thus far been discussed as if changes will affect technologists and technicians equally. Whether this will be the case is unclear. Although incentives to reduce costs might lead one to expect employers to seek to use the less expensive personnel, at times more highly trained staff can be more cost effective. Similarly, some technological changes, such as increased automation, may allow employers to expand their use of technicians or on-the-job trained personnel, others will require more highly trained staff. The trend appears to be toward increased use of higher level personnel with demand for lower levels strengthened by difficulties in hiring higher levels. A 1987 survey of the American Society for Medical Technology members reports this message. "Where hiring has occurred in the past two years ... more technologists with the bachelor degree were hired than were clinical laboratory technicians (CLTs). Though some facilities reported substituting specialists and more advanced personnel for entry-level practitioners, other reported hiring more CLTs and on-the-job trainees (OJTs)—to some extent as a result of a shortage of clinical laboratory scientists (CLS) professionals" (Price, 1988).

In sum, many of the changes occurring in clinical laboratories involve alternatives in the places in which testing occurs. Some of these are spurred by financial considerations, some by changes in the structure of the health care delivery system. Generally these changes do not affect the demand for trained personnel in a major way because they do not have significant impacts on the numbers or types of tests ordered. Although some extra testing is stimulated by the new settings, not all the work is being done by clinical laboratory technologists or technicians. A concern with laboratory work that has surfaced in the popular press, and has been voiced by the professional associations, relates to quality. Reports of inaccurate PAP smear readings and false positive AIDS tests have focused often on the laboratory personnel—which could result in increased demand for licensed personnel, or in the hiring of more personnel of all kinds to relieve pressures on staff.

For the future, downward pressures on test volume caused by payers' attempts to reduce costs will be offset by upward pressures as new tests are developed and the aging population demands more service. Similarly, technological change will cause as much expansion as reduction in demand for trained personnel of all levels.

Growth in demand for medical and clinical lab technologists and technicians will derive from general expansion of the health care industry, the aging of the population, and an increase in some specific trends such as increased therapeutic drug monitoring, testing for substance abuse and AIDS screening. Together, these upward pressures should lead to employment growth at a rate that could even exceed the 24 percent growth to the year 2000 predicted by the BLS. If either AIDS or drug testing becomes widespread, demand for clinical laboratory technicians and technologists will further increase. This rate of increase could be reduced if, as is likely, tests eventually become more automated.

Factors that would cause demand to change significantly and should therefore be monitored by those attempting to track employment of clinical laboratory personnel include:

- policies concerning AIDS screening
- policies concerning substance abuse testing
- technological change
- payers' attempts to control test volume
- quality concerns.
- trends in state and/or federal regulation of laboratory settings.

The three scenarios described in Chapter 3—mixed financing, prospective payment, and access—have some straightforward implications for demand for clinical laboratory technologists and technicians. Under the mixed model, growth in jobs is expected as described earlier—probably in excess of 24 percent to 2000. If prospective payment becomes dominant, laboratory testing will come under scrutiny and incentives will ensure that all testing contributes to clinical management of patients. Technological changes to improve cost-effectiveness and decrease personnel, both in amount and level, will be adopted. But demographic pressures will still exert upward pressures. In sum, demand will grow at a slower pace under the prospective payment model than under the mixed financing scenario. If a policy to expand access to health care occurs, additional individuals receiving care will increase demand in all settings.

Supply of Medical Technologists & Medical Laboratory Technicians

The number of baccalaureate graduates in the field of medical technology has shown a downward trend since the end of the 1970s. In 1986 there were 4,477 medical technologists graduated, down 28 percent from 1980. The number of accredited programs for medical technologists also decreased, 26 percent over the ten-year period ending in 1986. Hospital-based programs closed most frequently, but closures in general occurred because of budget restrictions, the impact of PPS, a lack of qualified applicants, and a decreased need for laboratory personnel in the immediate geographic area (Committee on Allied Health Education and Accreditation, 1985).

During the past ten years, total certificate medical lab technician programs decreased 69 percent. But the associate degree medical lab technician programs increased over the ten-year period, and they increased over four-fold, from 38 programs to 214 programs. However, between 1985 and 1986 there was a 5 percent drop (Committee on Allied Health Education and Accreditation, 1987a).

The trend in the certificate and associate degree trained personnel (technicians) is less clear than for technologists. Although the 2,747 graduates in 1986 represent a 9 percent increase over 1980, graduations peaked at nearly 4,000 in 1984 and have trended downward since then. There are two routes to becoming a technician. One is graduation from a certificate program. Only 817 medical laboratory technicians graduated from the certificate programs in 1986, down 24 percent from 1981. The other route is via associate degree programs, from which the number of graduates increased 11 percent over the 1981 number, with 1,930 graduating in 1980 (Committee on Allied Health Education and Accreditation, 1987a).

At the start of this study anecdotal evidence from educators and others pointed to a surplus of clinical laboratory technicians and technologists. But during site visits and discussions with knowledgeable observers towards the middle of 1987, the committee began to hear of managers having trouble hiring staff for clinical laboratories. Other reports confirm this change (Meyer, 1988). Other evidence supports the suggestion that the labor market is getting tighter. A survey of directors of accredited education programs shows that between 1981 and 1986 the percentage of directors who considered the job market for laboratory technicians and technologists to be attractive increased substantially (Parks and Hendrik, 1988). An informal survey by the American Society for Medical Technology found 54 percent of constituant societies reporting an undersupply of clinical laboraory technologists. That figure was 38 percent for technicians (Meyer, 1988). A study commissioned by the Health Resources and Services Administration notes that shortages of medical technologists are occurring in some locales (Mathematica, 1987). Statewide surveys in North Carolina show the vacancy rates for clinical laboratory staff increasing from 4.6 percent in 1981 to 16.5 percent in 1986 (North Carolina Area Health Education Centers Program, 1987b). However, the salaries of technologists and technicians employed in hospitals between 1981 and 1986 increased 24 and 21 percent, respectively. This increase is low compared with 18 other types of hospital employees—of these employees only engineering technicians had an increase lower than 21 percent (University of Texas, Medical Branch, 1985 and 1987). This suggests that the difficulties in hiring may not have surfaced in 1986.

Conclusion

Making statements about the likelihood of future balances or imbalances between supply and demand for clinical laboratory personnel is complicated by the multiple routes of entry into laboratory work. Laboratory workers may have four or more years of postsecondary education or may qualify through a combination of shorter educational programs plus experience. Baccalaureate prepared technologists need less supervision than other personnel, and hold a variety of higher-level jobs such as laboratory director, manager, consultant, and education coordinator for hospital schools. Technicians may have two-year associate degrees or combine education and experience to become certified through a professional organization. Other laboratory workers are certified in special areas, such as cytotechnology or hematology, and others may have specialist certification in disciplines such as blood banking or microbiology. Finally, there are large numbers of uncertified workers as indicated by the discrepancy between the BLS job count and the number of certified personnel. These multiple routes of entry into a career in clinical laboratories make it difficult to assess the supply of laboratory workers of the future. Taking into account the comparatively modest expected growth in new jobs, and assuming that workforce behavior and staffing patterns do not change radically, graduations from clinical laboratory programs should be sufficient to keep demand and supply in reasonable balance to the year 2000 if the rate of graduation is sustained at its current level, at a minimum. The recent decline in the number of graduates must be halted. If this decline should continue, some improvements in salary and working conditions should be expected to bring supply and demand into balance. A number of factors make prognostications in this area tentative. If the growing number of biomedical technology firms become major users of laboratory personnel, diverting trained personnel from clinical laboratories, salaries and benefits would improve as employers compete for trained personnel. If the personnel trained in disciplines such as chemistry and microbiology are no longer available to medical laboratories there could be problems because these personnel are used to fill jobs when the labor market is tight. A significant change could come about as a result of employers using personnel differently. For instance laboratory managers may choose to substitute one level of personnel for another.

Much flexibility is possible. Today there is sometimes little or no differentiation in the way technologists and technicians are used. This could change. Finally, if a four-year degree becomes mandatory for licensure, and licensure becomes a more widespread requirement, the balance of supply and demand could be severely disrupted. There is increasing debate concerning the pros and cons of licensure whose purpose is to differentiate jobs according to academic qualifications. The scope of this study did not admit of a conclusion on this matter.

As a final note, the clinical laboratory labor market seems to adapt rapidly to changes, such as changes in health care financing incentives. In the course of this study the reports of graduates having a hard time finding jobs were succeeded by reports of shortage. Reasons given for this turnaround are varied. Laboratories may have allowed staffing levels to slip too far in an overresponse to prospective payment. Laboratory volume may have risen faster than the supply. Others say that the level of stress at the worksite has increased because of productivity pressures and increased complexity of care. Fear of AIDS adds to the stress, and salaries are not high enough to compensate, so people are leaving the field (Meyer, 1987). If these factors do generate an increase in the separation rate from the labor force it would have a significant negative impact on the supply of workers and neccessitate greater market adjustments.

Dental Hygienists

Demand for Dental Hygienists

The BLS estimates that in 1986, 86,700 jobs for dental hygienists existed. By 2000 this number is expected to have increased by 63 percent to 141,000. This rapid growth is based on several considerations: First, BLS analysts consider employment growth in dental offices to be the most important element in generating jobs for dental hygienists because the vast majority (97 percent in 1986) are employed in that industry sector (see Table 4.2). The BLS projection

TABLE 4.2: Dental Hygienists' Major Places of Wage and Salary Employment, 1986 and 2000 Projected

	Number of Jobs 1986	Percent[1]	Number of Jobs 2000	Percent[1]
Total Employment[2]	86,700		141,000	
Total Wage & Salary Employment	86,700	100.0	141,000	100.0
Offices of Dentists	84,300	97.3	137,300	97.4

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics. 1987. "Employment by occupation and industry, 1986 and projected 2000 alternatives." Moderate alternative. (Unpublished.)

[1] Percentages were calculated using unrounded figures and will therefore not be identical to percentages that may be calculated using the rounded figures provided above.

[2] Total Employment = wage and salary employment + self employment. Self-employed persons are not allocated by industry.

for dental hygienist employment is hampered by data collection problems that applies only to this sector. The survey on which the BLS data are based was sent to incorporated businesses only. A high proportion of dentists are not incorporated and therefore not included in the survey. Dentists offices provided nearly 460,000 jobs in 1986; this number is projected to reach 706,000 by 2000, a 53 percent increase. Contributing to this expansion is the BLS expectation that the number of working dentists will substantially increase by the year 2000 (from 151,000 to 196,000, almost 30 percent compared with 19.2 percent for all occupations). Moreover, these dentists are expected sustain their utilization of dental hygienists. BLS analysts believe that the entrance into the dental profession of younger dentists, who are taught how to make effective use of hygienists will cause the ratio of hygienists to total dentistal office staff to increase slightly.

Other assumptions on which BLS has based its high growth prediction include continued spread of dental insurance that will generate further demand for dental services, and the aging population's need for dental services, particularly people retaining their teeth for longer, and the "baby boom" generation's entry into middle age when periodontal disease becomes more prevalent.

The BLS notes that dental hygienists are often hired on a part-time basis. To be fully employed a hygienist will often take two or more part-time jobs. The projection of 141,000 hygienists' jobs by the year 2000 must therefore be substantially decreased to be translated into the number of hygienists employed. BLS analysts suggest that the reduction could be as high as 30 - 40 percent, which would result in an estimated 84,600 to 98,700 employed hygienists in 2000. This estimate is supported by data from a 1982 survey of 1,503 dental hygienists. The survey found that 29 percent of respondents worked in more than one location, indicating multiple jobs for most of this group. Six percent worked at three or more locations. (Dental Hygiene, 1982).

The demand for hygienists depends on the number of working dentists and the level of activity in their offices. The level of activity in turn depends on the prevalence of dental disease, the extent of dental insurance and the willingness and ability of uninsured people to pay for dental treatment.

The BLS assumption that the rate of growth of hygienist jobs will be double that of dentists depends on dentists being busy enough to want to employ hygienists. Dental insurance has exhibited rapid growth (from 12 million to 81 million people between 1970 and 1980), and there is still untapped potential for further growth. But some analysts suggest that the rate of the spread of dental insurance has past its peak. "The easy pickings have been gathered" as most large multi-state employers now offer dental benefits (Bishop 1983). The question remains whether the stimulation from increased dental insurance will be sufficient to offset the effect of dental disease prevention such as fluoridation and regular maintenance care. A major factor will be the extent to which dentists can expand the number of restorative treatments they perform.

Over 70 percent of dental costs are paid out-of-pocket and price is the most often cited barrier to dental care, as a result only approximately half of the population visit the dentist each year (Grembowski et al., 1984). The Bureau of Health Professions (BHPr) in a recent report notes the relationship between demand for dental care and national economic growth. BHPr used two different data series for dental expenditures to develop forecasts to 2015 using two scenarios of economic growth. For neither data set and scenario does future growth in dental expenditures reach the rate of growth observed from 1965 to 1985 (Bureau of Health Professions, 1987). Although the number of employed hygenists per dentist has increased substantially (from 4.0 per 100 in 1950 to 33.3 per 100 in 1986), the rate of increase since 1981 has been very slow. (Bureau of Health Professions, 1987). Only in the unlikely event that dentists become very busy will the momentum of the 1950s to early 1970s be regained.

There is also reason to question whether the BLS estimate of 196,000 dentists in 2000 is not too high. The number of graduates from dental schools peaked in 1982-83 and is expected to continue to decline reaching the level of the 1950s by the year 2000 (Solomon, 1988). Since dental schools have closed as the perception of an oversupply of dentists affects career decisions, BHPr expects dentists to number 156,000 by 2000—some 40,000 below the BLS estimate of dentists jobs.

There is clearly great potential for increased use of dentistry. Some of the potential will be realized by expansion of insurance and growth of real income. Some expansion will stem from increased periodontal disease and other opportunities for intervention with new types of procedures needed in an aging population. We question whether these increases will be sufficient to allow dentists to employ hygienists at the rate predicted by BLS.

The opportunities for employment of hygienists outside dental offices are limited today by regulations requiring them to work with dentists on site. Thus, populations such as the elderly in long-term care facilities, and physically and mentally retarded people in institutions, whose access to dental care is limited by their lack of mobility, cannot be served by hygienists alone. Although many in the dental hygiene profession are fighting the regulations that restrict their independence, if independent practice is achieved it should not be viewed as creating demand unless the regulations are changed.

In sum, although the number of jobs for dental hygienists will continue to grow, it seems unlikely that jobs will expand by over 60 percent by 2000—twice the high rate of expansion predicted for dentists.

The major factors that those concerned with future demand for dental hygienists should track include:

- the number and age of working dentists
- the extent of dental insurance
- growth of real personal income
- dental disease patterns
- changes in the practice of dentistry that influence consumers' attitudes toward dental use, i.e., technological developments that may reduce the pain of dental treatment
- changes in staffing patterns in sole and group dental offices
- progress toward independent practice.

The three scenarios described in Chapter 3 are driven by changes in the financing of health care. Financing of dental care is often independent of the financing arrangements for other types of health care, therefore the differences in demand for dental hygienists caused by the financing-driven scenarios are small. Unless dental care becomes a usual component of the benefits package in prepaid health plans, the expansion of such plans envisioned in the managed care scenario have little impact on demand for hygienists' services. Similarly, unless access to dental care is included in policies that increase access to health care generally, demand for hygienists will be remain unchanged.

Supply of Dental Hygienists

The Council on Dental Education reported that 198 accredited dental hygienists programs graduated 4,037 hygienists in 1986. The number of graduates declined gradually between 1980 and 1985, with 22.4 percent fewer people graduating in 1985 than in 1980, but showed a slight upturn in 1986 (American Dental Association, 1987).

Although most accredited dental hygienist programs require two years of study, or its equivalent, the number of programs taking three or more years to complete has been increasing. In 1985, 33 percent of all programs had this longer requirement. Thus the time taken to produce a dental hygienist is increasing. Entry requirements are also increasing. In 1970, 80 percent of the programs required only a high school diploma. By 1985, 64 percent of the programs still used the high school diploma as the minimum qualification for acceptance, but 23 percent of the programs required some college courses.

Representatives of the American Dental Hygiene Association and anecdotes suggest that in some locations there are acute shortages of hygienists. In one such locality, after a survey confirmed shortages, the dental association was willing to financially help the community college create a new hygienist program. This is an example of the sort of adjustments that are made to rectify labor market imbalances (McMahon 1986).

Conclusion

Whether the number of dental hygienists available over the next 12 years will be enough to maintain a good balance between supply and demand depends in part on whether the decline in the number of dental hygiene graduates can be halted. If there is no further decline in graduations there should be no need for major labor market adjustments. But, in order to halt the decline some changes must take place; dental hygiene must become more attractive to prospective students. This will happen if pay is increased and working conditions are improved. Resolution of some of the tensions between dentists and hygienists (which are discussed in Chapter 7) may prove to be a key to improving working conditions. These changes would also decrease the number of workers leaving dental hygiene, and bring back into the workforce some who had left. Relatively small adjustments now would avoid future dislocations and major adjustments later.

Dietitians

Demand for Dietitians

The Bureau of Labor Statistics predicts that by the year 2000, 53,800 dietician jobs will exist—an increase of 13,600 jobs, or 34 percent over 1986. This growth rate is the same as the BLS expects for respiratory therapy and speech pathology, but substantially below that expected for some other allied health occupations such as physical therapy, dental hygienists, and radiologic technicians.

The BLS data show that nursing homes and hospitals are the major sources of wage and salary jobs (roughly 14 percent and 39 percent respectively, see Table 4.3). School systems, public health departments, HMOs, and ambulatory facilities each employ small numbers. Employers such as retail eating and dining places, publishers of nutrition and other magazines, diet counseling services, child care centers, and food manufacturers also employ small numbers of dietitians. BLS data indicate 2,000 self-employed dietitians in 1986; this figure is projected to rise to 2,700 in 2000 (five percent of jobs in both years). A 1986 survey of members of the American Dietetic Association confirms that hospital and extended care facilities are the primary employers, employing 54 percent and 10 percent of full-time members, respectively. The survey also notes that although only 3.7 percent of full-time workers were self employed, over 33 percent of dietitians who work part time were self-employed (Bryk, 1987). BLS estimates that about 5% of jobs were filled by self-employed people. Dietitians thus differ from many other allied health occupations in their variety of employment settings and somewhat lesser dependence on hospitals.

Analyzing employment in terms of factors that will either stimulate or depress demand indicates that overall modest growth can be expected, probably lower than BLS projections. Factors tending to restrain growth include slow growth of the hospital industry. Indeed, it is notable that FTE employment in hospitals decreased even before the introduction of PPS and the decrease accelerated thereafter (American Hospital Association, 1985 and 1987). However, all of this reduction in hospital employment is not necessarily a reflection of reduced use of dietitian services by hospitals. Hospitals can contract for services rather than directly employ dietitians. Similar changes may be taking place in nursing homes.

The move to out-of-hospital services is likely to produce a modest shift of employment to ambulatory clinics but no significant change in the number of dietitians employed. Although prospective payment for hospital care is causing increased need for home care, the growth of dietitian employment in home care is inhibited by Medicare reimbursement regulations that prohibit dietitians billing for home visits. Rather they are included in administrative expenses of home health agencies. A study charged with making reimbursement recommendations to Congress noted that although dietary therapy is important, and necessary for a wide range of diseases, the present reimbursement approach is adequate (Health Care Financing Administration, 1986a). Another factor that can constrain the growth in demand for dietitians is the extent to which other professionals such as nurses or health educators are thought to provide substitutable services. In the current environment of price competition, except for some specific tasks, dietitian duties could conceivably be eliminated or performed by other personnel. No data on this phenomenon exist, however.

On the other hand there are factors increasing demand. One such factor is increased use of high technology nutrition services such as enteral and parenteral nutrition in (feeding through tubes and veins) institutional as well as home settings. But here, too, other professionals, such as pharmacists, compete with dietitians to provide services. Furthermore, the aging of the population and increased hospitalization of patients with complex problems requiring nutritional intervention should stimulate demand. Another important upward pressure on demand is the societal value placed on nutrition. For example, the fitness movement includes consciousness of the importance of good nutrition in health promotion and disease prevention. Grocery stores and magazine publishers employ dietitians to advise on the nutritional content

TABLE 4.3: Dietitians' Major Places of Wage and Salary Employment, 1986 and 2000 Projected

	Number of Jobs 1986	Percent[1]	Number of Jobs 2000	Percent[1]
Total Employment[2]	40,200		53,800	
Total Wage & Salary Employment	38,200	100.0	51,100	100.0
Hospitals, public and private	14,800	38.7	16,700	32.6
Nursing and personal care facilities	5,400	14.0	9,000	17.6

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics. 1987. "Employment by occupation and industry, 1986 and projected 2000 alternatives." Moderate alternative. (Unpublished.)

[1] Percentages were calculated using unrounded figures and will therefore not be identical to percentages that may be calculated using the rounded figures provided above.

[2] Total Employment = wage and salary employment + self employment. Includes 2,000 self-employed workers in 1986 and 2,682 in 2000 who are not allocated by industry.

of foods and to develop recipes. Individuals are willing to pay out-of-pocket for nutritional consultation available through independent practitioners or as a package with other services. Health care providers, seeking to compete with each other and attract consumers, are increasingly aware of the importance consumers place on nutritional advice in obesity and cholesterol control. Also associated with disease prevention and the high cost of treating acute conditions is the use of nutrition in preventing coronary disease. diabetes, obesity, hypertension, atherosclerosis, and arthritis. Providers at risk for the cost of care, such as HMOs, can be expected to use nutritionists to reduce the likelihood of acute illness. Public health departments are also concerned with preventing disease and provide nutritional services through such programs as WIC. One survey identified 22 state health agency program areas expected to use nutrition services and noted expanded nutrition services by local and state public health agencies (Kaufman et al. 1986). Although public health funding is tight it appears that new appreciation of the value of nutrition services is generating use.

The aging of the population will drive up demand for dieticians to care for the complex nutritional needs of nursing home patients. The BLS data reflect this in an expected increase of 3,600 jobs in nursing homes, which will increase the proportion of dietitian jobs in nursing homes from approximately 14 percent of all jobs in 1986 to 17.6 percent in 2000 (see Table 4.2).

Overall, employment growth expectations for dietitians are well above the national average but are moderate to modest when compared with some other allied health fields. The hospital sector is not likely to be a major source of new demand. Independent practitioners contracting with hospitals and nursing homes do not represent new opportunities but a different employment pattern. On the upside, public demand for nutritionists' services should create some new employment. This will most likely occur in settings marketing directly to consumers and settings where the dietitians' role in health promotion and disease prevention is valued. However, the increased potential for employment in any of these sites will create only a minor overall increase in demand.

Following is a list of factors that are important determinants of demand for dietitians:

- consumer desire for nutritional advice
- new places of employment such as the food industry and publishing
- trends in private practice
- trends in substitution of other professionals (nurses, health educators, home economists, pharmacists) for dieticians
- interest in, and payment for, health promotion/disease prevention and perceptions of the importance of nutrition.

Our three scenarios described in Chapter 3 have different impacts on demand for dietitians mainly through their role in health promotion and disease prevention.

Scenario One — Mixed Model

Moderate growth of demand for nutritionist services will occur through expansion of employment opportunities created by the aging of the population, direct consumer demand for services, and hospital admissions of patients with complex problems.

Scenario Two — Prospective Payment

In this scenario although hospital utilization of dietitians will be reduced, overall employment is less affected than other allied health occupations that are more dependent on hospital employment.

The growth of HMOs and managed care systems that emphasize health promotion and disease prevention, as well as marketing to consumers, will increase demand for nutritional services. Physicians working outside managed care systems will increase their scope of services and employ or contract for dietetic services in their offices. Consumers will adopt the attitude of health care providers emphasizing wellness. They are there- fore eager for nutritional services and information from all sources— food labeling, publications, independent practitioners, etc.

Scenario Three — Access

Policies that enhance access to care can stimulate dietetic services in several ways. By relieving financial pressures caused by low occupancy rates, hospital demand will revive. Hospitals will be able to hire staff to provide services considered marginal in times of fiscal constraint. Access to services for groups with special nutritional needs, such as migrants and pregnant teenagers, will stimulate demand for dieticians employed in primary care settings. But the increment in demand overall will be only moderate—substantially less than for the occupations more tightly tied to acute illness.

Supply of Dietitians

There are three major ways of becoming a registered dietitian. One is to graduate from a baccalaureate program in an appropriate field of study and complete an internship, the second is to complete a graduate program in dietetics. Because internships are in short supply (only about 900 per year compared with approximately 3,000 students who need internships), some graduates of dietetic programs do not proceed to registry. Thirdly, others circumvent the internship requirement by completing graduate degrees that do not require internships, and proceed to registration via that route. Coordinated undergraduate programs combine academic coursework with about 1000 hours of clinical experience.

Since 1980 the number of newly-registered dietitians has fallen 20 percent, from just over 3,000 to just under 2,400 (American Dietetic Association, 1987).

The consensus for the past few years is that there has been a surplus of dietetic professionals (American Dietetic Association, 1985). This conclusion should only be tentatively modified by the salary increase of 29 percent between 1981 and 1986 received by dietitians employed in hospitals—an increase comparable to that of pharmacists and staff nurses who are perceived to be in short supply (UIMB, 1981 and 1986). Because no other evidence of shortage or surplus was found it is assumed that a reasonable balance exists today.

Conclusion

If the number of new registrants per year is maintained at around the 1986 level of 2,400, or if only a very modest decline occurs, the committee estimates that supply and demand for dietitians will be in balance up to 2000.

However, halting the decline in registrations will require both that academic programs remain viable and that health care and educators act aggresively. Employers need to offer jobs as attractive as their competitors for dietitians outside the health care industry, as well as making dietetics as attractive as other possible careers. However, it is not always possible to discern differences in some of the jobs that registered dietitians hold and jobs held by other types of dietary personnel such as nonregistered graduates of dietetic programs and graduates of home economics or food service management programs. It is possible that these latter groups will be used in greater numbers if employers find it difficult to hire registered dietitians.

Emergency Medical Technicians

Demand for Emergency Medical Technicians

As it does for other fields, the Bureau of Labor Statistics in the case of Emergency Medical Technicians (EMTs) estimates the number of paid jobs. Because emergency medical techonolgy jobs are often filled by volunteers—by a ratio of 2 to 1 in 1984—the BLS stresses that its estimates cover only paid EMTs.

BLS estimates that there were 65,000 paid EMTs in 1986, a small number of whom had received the advanced training and field experience required to become an EMT-Paramedic. The BLS data exclude volunteers and do not distinguish among the three levels of EMTs. The lower (basic) level EMT-A and the upper level EMT-P have existed since the late 1970s.

In 1981 an intermediate level (EMT-I) was added to the available certifications (McKay, 1985). By 2000 the number of paid EMTs is expected to increase by 15 percent to 75,000. This growth is substantially below that of other allied health fields discussed in this chapter and below the expected 19 percent growth in the total U.S. labor force. BLS notes that this slow growth in employment will be shaped by conflicting forces. On one hand, population growth, especially the proportion of elderly, is expected to spur demand for EMTs. Progress in emergency medicine is also expected to increase demand. On the other hand, the rising cost of training and equipment coupled with the termination of federal startup funds for community emergency medical services, taxpayer resistance to increased local government expenditures, and the availability of unpaid volunteers are factors likely to constrain job growth for paid EMTs (Bureau of Labor Statistics, 1986).

Of the 10,000 EMT jobs expected by the BLS, state and local government will account for almost 40 percent (see Table 4.4). It has been noted anecdotally that the governments of major metropolitan areas throughout the United States have been examining existing emergency medical services and contrasting the benefits of contractual services versus government-run services. Decisions to use contractual services will of course lessen the expected growth of jobs within government, but overall demand should not be much affected by a change in employer.

There also appears to be movement towards privatization of EMS services. Along with large companies providing services on a contractual basis, there has been growth in physician-owned ambulance services and privately-run emergency departments that operate their own ambulance service. The BLS foresees 2,400 new EMT jobs available in privately-owned ambulance services—nearly a quarter of all newly created jobs.

The BLS predicts that hospital employment of EMTs will increase by 11 percent. This is based on a determination that hospitals, expecting emergency medical services (EMS) to be profitable, will compete with private ambulance services. But anecdotal evidence suggests that no trend towards hospital-managed EMS is developing. Though some hospitals have been entering the market, others have tested it and stepped away. However, there is evidence (also anecdotal) that EMTs are sometimes employed in hospital emergency departments—the nurse shortage being a major factor in decisions to employ EMTs (McKay, 1985).

The BLS projection does not differentiate between jobs for the basic EMT versus the more highly trained paramedic, but the availability of volunteers makes such a differentiation important. Technological developments have virtually transformed ambulances into mobile intensive care units employing technicians with skills in defibrillation, endotracheal intubation, pharmacology, and other aspects of intensive care. Volunteer technicians are usually not adequately trained to

TABLE 4.4: Emergency Medical Technicians' Major Places of Wage and Salary Employment, 1986 and 2000 Projected

	Number of Jobs 1986	Percent[1]	Number of Jobs 2000	Percent[1]
Total Employment[2]	65,200		75,000	
Total Wage & Salary Employment	65,200	100.0	75,000	100.0
Local and interurban transit	25,500	39.2	27,900	37.2
State and local governments[3]	24,500	37.6	29,700	39.6
Hospitals, public and private	14,600	22.4	16,200	21.7

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics. 1987. "Employment by occupation and industry, 1986 and projected 2000 alternatives." Moderate alternative. (Unpublished.)

[1] Percentages were calculated using unrounded figures and will therefore not be identical to percentages that may be calculated using the rounded figures provided above.

[2] Total Employment = wage and salary employment + self employment.

[3] Does not include government hospitals and schools.

appropriately assume that level of care (Smith and Bodai, 1985). As the use of advanced life support techniques become more commonplace, demand for paramedics is likely to increase sharply relative to other levels of emergency medical technicians. Volunteer technicians typically have only basic training and so provide little or no competition for jobs requiring advanced skills. However, the lower level basic-EMT seeking a job must compete with the volunteer.

Increased demand for the basic EMT can be expected from the non-emergency transportation sector. One consequence of Medicare's prospective payment system has been the early discharge of elderly patients. Patients still in need of nursing care are often transported in ambulances to nursing homes. EMT-basics are employed care for the patients in transit.

Supply of Emergency Medical Technicians

Emergency medical technicians are trained in a variety of settings. Accredited educational programs for EMT-Paramedics came into being in 1982 and have graduated a total of 2,466 EMT-Paramedics through the 1985/86 academic year (Committee on Allied Health Education and Accreditation, Allied Health Education Directory, 1984, 1986, 1987; Journal of the American Medical Association, September 1983, September 1984, September 1985). A greater number of paramedics are trained in unaccredited programs. According to the National Registry of EMTs, there were 440 EMT-Paramedic training programs in 1985, of which only 15 were accredited. The 1985 National EMS Data Summary lists a total of 5,059 EMT-Paramedics being trained annually. Only 42 states and the District of Columbia responded to the survey. Three large states—California, New York and Texas—were not among those reporting figures. Thus, the number of EMT-Paramedic graduates is substantially higher than 5,059. The same survey shows a total of 83,650 basic EMTs being trained annually (National EMS Clearing House, 1985).

Observers of the field say that paramedics are in very short supply. The opportunity cost of training and rapid burnout discourages entry into the field.

There is very rapid turnover among EMTs. The average volunteer is active for only five to six years (Lucash, 1983). The turnover rate among full-time employed EMTs is said to range between 20 and 40 percent.

The committee was frustrated by the lack of reliable data on the basic characteristics of the EMT workforce and forces that influence their training and use. These appear to vary among communities, and are also changing rapidly. This field exemplifies the problems of trying to predict the future in the absence of a well organized professional association that collects, or stimulates the collection of manpower information. This lack also makes it more difficult for BLS to make a useful occupational classification.

Lacking data on numbers and trends in training of EMT-Paramedics and Basic EMTs, it is impossible to make an assessment of future trends in the balance between supply and demand. Anxiety about the quality of emergency services has surfaced in some cities. Should this anxiety spread, demand for more highly trained individuals could put pressure on the supply pipelines. Data collection could help clarify facts that decision-makers need to ensure the smooth running of emergency medical services. As recommended in Chapter 2, an interagency task force could work towards a data collection plan.

Medical Administrators and Technicians

Demand for Medical Record Technicians

The BLS projects that the number of jobs for medical record technicians will grow by 75 percent from 39,900 in 1986 to 69,800 in 2000. This rapid growth exceeds the rate predicted for any of the other allied health fields studied in this report, except for physical therapy. Unfortunately, BLS does not make a projection for employment of medical record administrators. The expectation of rapid growth in jobs for medical record technicians is predicated on the increasing importance of the medical records function in financial control and billing. BLS analysts believe that this high rate of growth is likely because health care payers are requiring more detailed and accurate medical records for reimbursement purposes in all settings, including outpatient. In the past, many jobs in medical record departments and physician offices were filled by individuals trained on the job to perform coding and transcription tasks. But, increasing payer demands have raised the complexity of work so that staff trained on the job are no longer adequate. Thus, a surge in demand for certified technicians is expected.

This analysis can be substantiated to a great extent. Data from the American Hospital Association show that employment in U.S. registered community hospitals of medical record technicians grew by 6 percent in the two years following the introduction of PPS, compared with 2.5 percent in the two earlier years (American Hospital Association, 1985 and 1987). Employment of the more highly-qualified medical record administrators expanded by 2.1 percent in both the two years before and the two years after PPS. The American Medical Record Association (AMRA) studied the impact of PPS on a sample of 775 hospital medical record departments.

Study findings noted that 93 percent of respondents agreed that prospective payment required greater expertise, and 75 percent noted more stringent hiring standards (Schraffenberger 1987). Another AMRA study attributes at least some of the observed increases in numbers of employees and salaries to the advent of PPS (Bernstein, 1985). Whether this translates into hiring more credentialed practitioners is not stated, but another AMRA survey noted that a "substantial percentage" of departments filled coding positions exclusively with credentialled professionals (Whitlock and Whitmore, 1987).

Although the impact of PPS is one factor in accelerating demand for medical records technicians, the role of medical records in utilization review and quality control must also be noted. The complexity of medical records systems that interface with utilization and quality review systems and with physician office linkages, raises the required skill standards as well as generating increased demand for personnel.

Automation of medical records departments has been occurring fast. In 1981, 28.3 percent of hospitals sampled by Shared Data Research had some automation. By 1984 this figure had risen to 48.1 percent (Packer, 1985). Undoubtedly the close connection between the medical record, billing, and cash flow encourages automation in order to speed payments. The questions of whether, and if so when, the use of computers will slow down the demand for medical records technicians is not clear. However, retention of the paper medical record appears to be common, because computer technology cannot completely substitute. For example a paper record is needed if litigation occurs.

Even official attempts to simplify medical record tasks seem to backfire. The UB-82 form, an attempt to create a form that all payers could use, served only to increase the workload for coders and has resulted in the hiring of additional staff (Burda, 1984).

In 1984, about three-quarters of all medical record technicians' jobs were in hospitals. The pattern of employment is changing and BLS expects that it will continue to change. By 1986 only 61.5 percent of all jobs were in hospitals. By 2000 the BLS expects hospital employment to have fallen to about 58 percent, and employment in out-patient facilities to have risen from 9 percent in 1986 to almost 13 percent in 2000. Increased demand from non-hospital health care providers is expected to rise for many of the same reasons as demand from hospitals is rising. Payers' documentation requirements are increasing for all settings and documentation for billing purposes is tied to medical records.

In sum, demand for qualified medical record personnel is related to the amount and sophistication of required documentation for purposes that include reimbursement of services, malpractice protection and quality of care considerations. The ongoing changes in reimbursement policies, with payers increasingly concerned with appropriate utilization of services, will continue to generate steady increases in demand for medical records personnel. However, the rate of increase is likely to slow as record systems become better established. Thus, the greatest increase would occur at the beginning of the period. The BLS estimate of a major (75 percent) overall increase in demand to the year 2000 is supported by the expansionary forces at work.

For those looking to the future, important factors to monitor include:

- changes in payment systems and regulation
- growth of new employment opportunities in out-of-hospital settings
- impact of automation
- new uses of information contained in medical records.

The three financing driven scenarios described in Chapter 3 have direct and simple implications for the demand for medical records technicians. The spread of prospective payment stimulates demand as the amount and complexity of documentation tied to payment increases, and facilities use the medical record to review utilization as a part of cost control efforts. Demand in the access scenario increases in proportion to the amount of increased service generated.

Demand for Medical Services Administrators

Because the BLS does not project demand for medical record administrators we do not have an estimate of 2000 employment. The number of persons with a bachelor degree in medical record administration is relatively small (approximately 9,500 people have graduated with the credential since 1970) (Committee on Allied Health Education and Accreditation, Allied Health Education Directory, 1979-87; Journal of the American Medical Association, September 1984; September 1982; September 1981; Council on Medical Education of the American Medical Association, Allied Medical Education Directory, 1978, 1972-74). It is difficult to determine how employers view the difference between the more highly educated administrator and the technician. Roughly half the directors of medical record departments have the administrator credential, and half are registered technicians (Amatayakul, 1987). When medical record technicians are department directors it cannot be guessed whether this occurs because administrators are not available or because they are too expensive, or because technical level skills are adequate for this work. Given this uncertainty, it is not possible to discuss differences in future demand for medical record administrators and medical record technicians.

The Supply of Medical Record Personnel

Although graduations of both medical record administrators and medical record technicians have increased since 1980—20 percent for administrators, 27 percent for technicians—the increase shown by technicians has been steadier. Together the two types of programs produced almost 2,000 graduates in 1986, of which about 46 percent were at the administrator level. The number of accredited technician programs grew rapidly in the late 1970s. Today there are 87 programs, but the last six years produced only 7 percent of them (Committee on Allied Health Education and Accreditation, 1987a). Some schools have closed, in part because of a decline in the applicant pool and in part because of budget problems and accreditation requirements (Committee on Allied Health Education and Accreditation, 1987b).

Graduates of accredited programs do not represent the total supply of workers to fill jobs in medical record departments. Substantial numbers of employers who "compile and maintain medical records" (the BLS job description) are trained on the job to do transcription and other tasks for which extensive training is not necessary.

Assessing whether there is currently a good balance between supply and demand for medical record administrators and technicians is complicated by the availability of workers who can be trained to fill the less skilled jobs if necessary. It seems unlikely that widespread reports of job vacancies will occur if employers can concentrate their use of skilled practitioners where needed, and fill in with others. However, the findings of one salary survey, suggest that employers may be struggling to fill jobs with qualified practitioners. Between 1981 and 1986, the starting salary for medical record administrators in hospitals increased by 45 percent— substantially higher than any of 19 other types of hospital employees. Medical record technicians did less well (possibly because they are more available or possibly because they are more vulnerable to substitution). Their gain was 24 percent, an increase exceeded by half the group of hospital employees (UTMGB, 1985 and 1987).

Conclusion

If one assumed that graduates from accredited schools were the only source of medical record technicians and that demand would grow at the rapid rate predicted by the BLS to the year 2000, there would not be enough trained technicians to fill the jobs. However, these assumptions are not realistic. We offer them merely as a starting place from which we will indicate how the labor market is likely to work. First, workers who have not had the benefit of accredited education do fill jobs in medical record departments and will continue to do so to some extent. However, current trends indicate that the knowledge and skill level needed in medical records is rising, and will continue to rise in the foreseeable future. Therefore a greater proportion of trained practitioners will be needed to fill current and new jobs. Graduations of administrators and technicians are on a rising trend and the number of accredited programs is growing, albeit slowly, thus it is likely that the supply of trained technicians will grow—not remain constant as in our initial assumption. In sum, to avoid a shortage of medical record personnel to the year 2000, the labor market must make major adjustments that will cause medical record technology to be viewed as a more promising career than it is today. One likely change is that the investment in medical record education will be recognized in greater pay, status, and task differentiation—and there are indications that this is already happening. As this happens the number of specially trained workers should grow, enabling employers to continue to phase out those with only on-the-job training.

Occupational Therapists

Demand for Occupational Therapists

The BLS estimates that jobs for occupational therapists will increase by 52 percent between 1986 and 2000, from 29,300 jobs to 44,600. This predicted high growth rate is lower than that predicted for physical therapists in part because a greater proportion of occupational therapists are employed by the slow growing education sector. Just over 36 percent of occupational therapy jobs were in hospitals in 1986, and 13.2 percent were in government employment (excluding education institutions and hospitals). Four-and-a-half percent of jobs were classified by BLS as in "offices of other practitioners"—that is offices of practitioners other than physicians (including osteopaths) and dentists, and includes the offices or independent practice occupational therapists. (see Table 4.5).

BLS analysts identified a number of factors expected to drive this predicted strong growth in employment. These factors include occupational therapists increasing their share of hospital employment; federal legislation concerning services for handicapped children increasing employment in school service, and increases in private practice opportunities stimulated by improved reimbursement.

These factors will undoubtedly stimulate demand for occupational therapists. Hospitals provide over one-third of available jobs today and the growth rate in this sector will have an important influence on demand for occupational therapists. Occupational therapy is one of the few allied health groups that sustained employment growth in the two years after the introduction of PPS. FTE employment in U.S. registered hospitals increased by 10.7 percent between 1981 and 1983, and by 22.7 percent between 1983 and 1986 (American Hospital Association, 1985, 1987, and 1988). Some of this growth in hospital employment is the result of more hospitals offering occupational therapy services. Between 1980 and 1983, 268 hospitals added occupational therapy to their list of services, and a 1984 survey of hospital CEOs indicated that 18 percent planned to add or expand occupational therapy services. (American Occupational Therapy Association, 1985). Despite this history of strong growth, unless occupational therapy can be established as enhancing the early discharge of patients, the service could be vulnerable to cuts if hospital operating margins continue to be threatened.

However, demand for occupational therapists in prolonging the independence of AIDS patients, could in the future, generate demand for more occupational therapists. The role of occupational therapy in caring for the mentally sick and in such settings as half-way houses can only be inferred from the BLS data. Psychiatric hospitals and psychiatric units of general hospitals are included in the hospital industry estimates, and occupational therapy services often are provided by contractors to, for example, half-way houses. However, occupational therapy has a long history as part of the team caring for people with mental illness. Future demand from this sector of the health care system will be determined by mental health insurance coverage, the availability of publicly sponsored programs and the evolution of treatment modalities for mental illness.

What the data do not show is the extent to which employment growth was sustained by the use of occupational therapists in hospital based rehabilitation facilities, which have not come under PPS. According to the American Occupational Therapy Association's 1986 member survey, roughly 40 percent of hospital employment was in rehabilitation (American Occupational Therapy Association, 1987). Demand for occupational therapists in rehabilitation care is being stimulated by two factors. One is the discharge of patients from the acute care hospital to rehabilitation facilities to escape the PPS setting. The second, effective July 1987, is the addition of occupational therapy as a Medicare covered rehabilitation agency service under Part B of the Medicare regulations (Scott, 1987).

Medicare has made other changes that will stimulate demand for occupational therapists. Since July 1987 occupational therapy has been covered by Medicare Part B for service in skilled nursing facilities. This provision will allow billing of Medicare for occupational therapy services and will provide a new incentive for therapists to establish practices marketing to nursing homes.

Home health care represents another area of potential growth in demand for occupational therapists. The number of occupational therapists employed by certified agencies rose from 410 in 1983 to 3,979 in 1985 and

TABLE 4.5: Occupational Therapists' Major Places of Wage and Salary Employment, 1986 and 2000 Projected

	Number of Jobs 1986	Percent[1]	Number of Jobs 2000	Percent[1]
Total Employment[2]	29,400		44,600	
Total Wage & Salary Employment	26,300	100.0	40,000	100.0
Hospitals, public and private	9,600	36.3	13,700	34.3
Outpatient care facilities	16,000	6.3	3,400	8.6
Offices of physicians	400	1.5	760	1.9
Offices of other hlth practitioners[3]	1,200	4.4	3,100	7.9
Education institutions, private and public	4,400	16.7	5,100	12.8
Federal, state, and local government institutions[4]	3,500	13.2	4,100	10.2

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics. 1987. "Employment by occupation and industry, 1986 and projected 2000 alternatives." Moderate alternative. (Unpublished.)

[1] Percentages were calculated using unrounded figures and will therefore not be identical to percentages that may be calculated using the rounded figures provided above.

[2] Total Employment = wage and salary employment + self employment. Includes 3,000 self-employed workers in 1986 and 4,644 in 2000 who are not allocated by industry.

[3] Offices of health practitioners other than physicians (including osteopaths) and dentists. Includes offices of self-employed occupational therapists.

[4] Does not include government hospitals and schools.

dropped to 1,997 in 1986 (National Association for Home Care, 1987). In view of the upward pressures on demand for occupational therapy services in the home it seems likely that some of the decrease is due to increased contracting for occupational therapy services.

In 1986 new federal legislation (Public Law 99-457) was enacted that should increase demand for occupational therapists by the educational sector. This legislation increased federal funds to encourage state departments of education to provide special education and related services to handicapped preschoolers. Occupational therapy would be available to children who need it in order to benefit from special education (American Occupational Therapy Association, 1986a).

Other factors tending to generate demand for occupational therapists are related to demographic and disease changes. These include increased survival of head trauma victims and low birth weight neonates. In 1973 no respondent to a survey by the American Occupational Therapy Association reported head injury as being among the most frequently seen problems. By 1986 3.3 percent reported head injuries as seen most frequently. Similarly, developmental disabilities (excluding mental retardation) rose from 5.8 percent in 1978 to 16.5 percent in 1986 as the most frequently seen problem (American Occupational Therapy Association, 1985; American Occupational Therapy Association, 1987). The aging of the population has implications for greater use of occupational therapy in nursing homes, home care, and hospitals. It is estimated that about 17 percent of occupational therapy work is with elderly patients, and that large numbers of nursing home residents would benefit if occupational therapy were available (National Institute on Aging, 1987). But significant increases in the role of occupational therapy in nursing home care are unlikely unless financing becomes more generous, or regulations require it.

Some disease patterns and financing moves should generate downward pressures on demand for occupational therapists. For example, the incidence of cardiac disease and cerebro-vascular accidents (whose sequelae are commonly treated by occupational therapist) is declining— although this will be offset to some extent by increased survival rates. On the financing side, efficiency incentives and competition are expected to continue to force facility managers to seek ways to reduce costs. Occupational therapists may be asked to increase productivity and/or may be vulnerable to reductions in employment by managers seeking to trim staff.

In sum, the upward pressures on demand for occupational therapists are expected to exceed and overwhelm downward pressures. Growth in demand will be greater outside the acute care hospital sector and should be sufficient to be of the order of magnitude predicted by BLS. One uncertainty which could substantially decrease demand in the future is Medicare payment for rehabilitation services. While extension of PPS on a diagnosis basis in rehabilitation is unlikely, some sort of incentives for economic restraint are slated for introduction.

Factors that should be monitored by those interested in assessing demand for occupational therapists include:

- Medicare payment and regulations for rehabilitation services
- growth of the hospital sector
- demographics concerning school age children, and programs for handicapped children
- participation of home care and other long-term care services
- the roles of competing occupations such as recreational therapists.

Our three scenarios reflecting three different health care funding environments affect demand for occupational therapists mainly through the impact on hospital care.

Scenario One — Mixed model

This scenario foresees continuation of most trends in evidence today. Demand for occupational therapists to work in hospitals and rehabilitation facilities continues to increase steadily, assuming that the latter remain free of PPS. Demand from skilled nursing facilities and home care agencies also show modest but steady growth as more older people need service.

Scenario Two - Prospective Payment

The financial incentives incorporated in this prospective payment scenario create downward pressures on demand for occupational therapists. Under this scenario managers in general hospitals will scrutinize cost effectiveness studies for evidence that occupational therapy decreases length of stay, and is cost effective. Similarly, large employers will include occupational therapy in benefits packages if it is shown that it speeds return to work. Lacking such evidence, growth in acute care hospital and outpatient employment will be negligible. Rehabilitation facilities, also working under prospective payment, will reduce demand for all types of personnel.

Nursing homes and home care agencies will increase their demand for occupational therapists but this will not offset the drop in demand from the hospital sector. Independent practice will thrive as consumers seek services that are no longer available to them from institutions striving to reduce costs.

Scenario Three — Access

The surge in demand for medical care generated by a policy of increased access to care will stimulate demand for occupational therapists, providing that rehabilitation services for newly entitled groups will be incorporated into new benefits packages. Orthopedic problems that might have remained untreated for lack of funding can be cared for. Rehabilitation services needed after the acute phase of trauma or stroke can be provided. Handicapped individuals will have good access to occupational therapy services beyond their school years. If such groups as homeless people gain access to care, and mental health coverage is expanded, demand for occupational therapists will be increased.

Supply of Occupational Therapists

For the past decade the number of occupational therapy graduates has fluctuated from year to year but has averaged around 2,000 for the last two years. After several years of stagnation in the 1980s, the number of accredited programs recently jumped from 56 in 1985 to 63 in 1986 (Committee on Allied Health Education and Accreditation, 1987a). This surge appears to have outstripped the availability of full-time faculty, forcing programs to rely increasingly on part-time faculty (American Occupational Therapy Association, 1985). Furthermore, fieldwork placement of student is becoming more difficult. Education programs reported 424 facilities cancelling placements in 1984/85. This figure had risen to 625 in 1985/86. The most frequently cited reason for cancellation was loss of occupational therapy staff (American Occupational Therapy Association, 1986b).

The committee heard persistent reports of employers' difficulties in recruiting occupational therapists especially for rehabilitation facilities. These reports are substantiated by the few employer surveys that exist (Veterans Administration, 1987; North Carolina Area Health Education Centers Program, 1987b).

Also supporting the notion that occupational therapists are in short supply is the finding of a survey that starting salaries of occupational therapists in hospitals increased 31 percent between 1981 and 1986. This is comparable to 30 percent for pharmacists and 27 percent for staff nurses who are generally felt to be in short supply (UTMGB, 1985 and 1987). These indicators of a tight labor market are generated from the health care sector. Whether employers in other sectors are also having trouble hiring occupational therapists is not known. Nor is it known whether the opportunities for employment outside the health care sector might not be causing the health care employer's problems.

Conclusion

Assuming that through the year 2000 the education sector is unable to respond to increased demand because of faculty shortages, we expect to see health care employers making some adjustments that use the existing labor force more effectively and encourage extended tenure and return to the labor force. Such adjustments are likely to include improvements in productivity, cutting use of occupational therapy in ways that have the least effect on patient care, and raising salaries. If faculty can be recruited to allow education programs to expand, employers will have to make adjustments to attract people into careers in occupational therapy. Thus, to maintain a balance in supply and demand it will take both salary and working condition improvements to bring in students, as well as expanded education capacity to prepare the students for the workplace. If the market for some reason—such as health care facilities being unable to afford salary increases—fails to make sufficient adjustments, a shortage of occupational therapists is likely.

Physical Therapists and Assistants

Demand for Physical Therapists and Assistants

The BLS expects growth in the number of jobs available to physical therapists to exceed growth in all other allied health occupations. Between 1986 and 2000, 53,500 new jobs are predicted, representing an increase of over 87 percent from 61,200 jobs to 114,700 jobs. This prediction is based on an expectation of rapid growth in several settings. In the hospital the push to shorter stays is expected to increase demand for therapists. The move to home care is expected to increase demand for physical therapists in that setting. And the attractions of independent practice are expected to continue to draw therapists.

Although all the major settings in which physical therapists work are expected to experience substantial increases in demand, it is notable that employment in "offices of other health practitioners" (that is, offices of health practitioners other than physicians and dentists) will grow nearly threefold (adding over 25,000 jobs) to become the major employment setting for physical therapists with almost 35 percent of all jobs. By contrast, hospital employment will grow about 43 percent, adding 8,500 jobs, but by 2000 will provide only 27 percent of jobs compared to the 35.5 percent share it had in 1986 (see Table 4.6). However, some of the therapists working in the "offices of other health practitioners" will be supplying service to hospitals and other health care facilities on a contractual basis.

The BLS expects demand for physical therapy assistants to increase by 82 percent between 1986 and 2000 to 65,000. The similarity of the rate of growth for this group of practitioners to the predicted growth rate for physical therapists is due to the BLS analysts determination that the same factors drive demand for the two groups. Payers can have significant impact on the use of assistant level practitioners, however. Comments made during the committee's site visits to hospital physical therapy departments mentioned that limited use was made of assistants because of Medicare requirements that physical therapists perform the regular evaluations needed to document progress. This is felt to limit the usefulness of assistants so that their employment is curtailed. Physical therapists, themselves, have been reluctant to employ assistants.

There is substantial support for the assumptions made by BLS about growth in demand for physical therapists. Unlike the level of hospital employment of most other allied health occupations, hospital employment of physical therapists was not reduced in the years immediately following the introduction of PPS. Rather, employment of physical therapists continued to grow increasing by 5.3 percent between 1983 and 1985. (American Hospital Association, 1985 and 1987). Other evidence supports the idea that PPS has not served to reduce the use of physical therapy in hospitals. A study of seven acute care hospitals in one county indicated that referrals of Medicare patients to both inpatient and outpatient physical therapy increased after the introduction of DRGs. The implication drawn from this study is that physical therapy is seen as an effective and efficient treatment that can help to rehabilitate patients within time and economic constraints (Dore, 1987). Hospital employment is also being sustained by the expansion of hospital rehabilitation facilities and by the increasing intensity of care needed by inpatients. Since rehabilitation facilities are excluded from PPS these units are used to facilitate discharges to the less restrained payment environment.

The American Physical Therapy Association (1987a) reported that therapists in home health increased their hours of service and that demand for services in nursing homes increased. In 1983, there were approximately 1,700 physical therapists employed by Medicare certified home health agencies. An additional 2,155 provided contract services in the home. By 1985 the number of therapists employed in such agencies had increased to 6,685 and dropped only slightly to 6,234 in 1986 (American Health Care Association, 1987).

The movement of patients out of the hospital to home health, nursing homes, and rehabilitation facilities represents a change in location of services rather than an increase in employment. However, some factors are generating an increase in employment in all settings. One such factor is physicians' and the public's perception of the need for physical therapy. Practitioners note that physician perception of the value of physical therapy services sustains the level of referrals at the same time as patient demand for therapy, especially for sports-related injuries, is at an all time high.

This latter reason is one of the factors enabling physical therapists to practice independently. According to a survey by the American Physical Therapy Association, between 1978 and 1983 the number of self-employed physical therapists increased from 10.0 percent to 14.6

TABLE 4.6: Physical Therapists' Major Places of Wage and Salary Employment, 1986 and 2000 Projected

	Number of Jobs 1986	Percent[1]	Number of Jobs 2000	Percent[1]
Total Employment[2]	61,200		114,700	
Total Wage & Salary Employment	56,200	100.0	105,400	100.0
Hospitals, public and private	19,900	35.5	28,400	26.9
Offices of physicians	3,300	5.8	4,900	4.6
Offices of other hlth practitioners[1]	11,500	20.4	36,600	34.7
Outpatient care facilities	3,000	5.3	6,500	6.2

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics. 1987. "Employment by occupation and industry, 1986 and projected 2000 alternatives." Moderate alternative. (Unpublished.)

[1] Percentages were calculated using unrounded figures and will therefore not be identical to percentages that may be calculated using the rounded figures provided above.

[2] Total Employment = wage and salary employment + self employment. Includes 5,000 self-employed workers in 1986 and 9,300 in 2000 who are not allocated by industry.

[3] Offices of health practioners other than physicians (including osteopaths) and dentists. Includes offices of physical therapists.

percent of full-time therapists. However, since 1983 this has only increased to 15.8 percent. Part-time self employment shows a similar pattern, growing from 4.3 percent to 6.6 percent of employment between 1978 and 1983; and representing 7.7 percent of employment in 1987 (American Physical Therapy Association, 1987b). Whether this reduced growth results from lack of growth in demand for the services of independent practitioners, or lack of interest in that form of practice is not known. Equally likely is that the rate of growth in independent practice will pick up again. Moreover, these self-employment figures do not represent the whole picture of independent practice. Some therapists work for the proprietors of independent practices. In 1987 24.2 percent of respondents to the American Physical Therapy Association's survey said that they worked in a private physical therapy office. This figure probably includes the 17.9 percent who said they were owners, partners or president of a practice or business (American Physical Therapy Association, 1987b).

While some therapists in private practice have contracted to supply hospital services, others have thriving practices to which physicians refer patients or patients (in some states) refer themselves. Thus, therapists are able to benefit directly from public perception of the value of their services. Committee site vists showed that even in managed care systems, where utilization can be controlled, managers note that patient demand for physical therapy is pushing them to expand services--and in a competitive environment managers are responsive to patient demand. Last, but not least, as a factor generating growth in demand for physical therapists, is the aging of the population. Elderly people need a greater volume and intensity of service to treat their multiple problems. Sixty-seven percent of physical therapists report that patients 64 and older are part of their patient population on a typical day (American Physical Therapy Association, 1987b). Demand from this important sector can only increase. Some care of the increasing numbers of elderly patients will take place in their homes. The lower productivity of physical therapists who must travel to clients, as opposed to providing services in health care facilities, will further stimulate demand for practitioners.

The availability of financing of physical therapy services should allow these changes to translate into sharply increased demand for therapists. Financing for physical therapy services is relatively available. Insurers and employers have recognized the role of physical therapy in enabling people to return to work or preventing institutionalization in expensive settings. Commercial insurers often cover the service. Worker's Compensation programs cover much of the expense for testing and therapeutic treatments by physical therapists. Increased sensitivity to long-term costs has stimulated employers to cover the rehabilitation of workers and pay for injury prevention programs in the workplace. Medicare covers home visits by physical therapists and physical therapy services in inpatient and outpatient settings and has not yet placed rehabilitation facilities under any kind of prospective payment.

In sum, a combination of many factors should generate strong increases in demand for physical therapists. The only foreseeable major change is the introduction by Medicare of a system of payment for rehabilitation services containing an incentive to economize or ration services. If the past pattern of hospital staffing in response to DRG recurs, even this incentive may not reduce demand for physical therapy services.

Trends that are important to the future of demand for physical therapists and should be monitored include:

- growth of hospital care
- physician and public valuation of services
- changes in rehabilitation reimbursement and
- perceptions of effectiveness in facilitating early discharge from hospitals, early return to work, and in preventing injury in the workplace.

The major role of financing in generating demand for physical therapists is reflected in the response of demand to the three scenarios described in Chapter 3. A downturn in demand is not foreseen in any scenario.

Scenario One: Mixed Model

With a continuation of several financing systems existing side by side, demand for physical therapists will be high. Commercial insurers will pay independent practitioners and allow them to serve patients who increasingly want care for sports injuries, lower back pain and other diagnoses treatable on an outpatient basis. Hospital use of physical therapists is stimulated by the admission of older sicker patients who need services and by facilitation of earlier discharge. Outpatient use increases, too, as financing continues to be available in all settings. Dampening demand, however, is an increasing effort on the part of HCFA and other third parties to devise more stringent reimbursement screens as a means of constraining growing utilization.

Scenario Two: Prospective Payment

With prospective payment the predominant form of financing, demand for physical therapists will be somewhat lower than under the mixed payment model. Therapists in independent practice will feel the impact as they are forced either to join a managed care system or to rely on patients' willingness to pay for services out-of-pocket. Emphasis on case management, utilization control, and cost effectiveness will reduce the rate of growth in demand for therapy services as physicians and case managers become selective about services. Proved effectiveness will become increasingly important, and, until a body of research becomes available to prove effectiveness, demand for some therapeutic modalities will fall.

Scenario Three: Access

Demand for physical therapists will receive an added impetus if access to care is increased. Non-acute problems and preventive services such as for back pain, muscle strain, arthritis, and osteoporosis that went unattended in the absence of reimbursement will bring newly-financed patients into the medical care system. Diminished need to cross-subsidize services for indigent patients will relieve some financial pressures on hospitals allowing a little lightening of productivity pressures and greater responsiveness to patients' demand for physical therapists.

Supply of Physical Therapists

Graduations from accredited baccalaureate, masters, and certificate programs in physical therapy increased by 43 percent between 1979-1980 and 1984-85 to reach 3,499 in the latter year. The growth in the last year of that period, however, was only two percent (American Physical Therapy Association, 1987d). This reduced rate of growth should not be interpreted as evidence of a drop in student interest. Rather, one dean described physical therapy programs as the "hottest spot on campus." A study conducted for the Health Resources and Services Administration shows that there is pressure on programs to expand their number of students. However, finding clinical sites for training may be slowing expansion (Mathematica, 1987).

Although competition for therapists is encouraging hospitals to continue or start training affiliations in order to ease their recruitment problems, they also are concerned about the costs, preferring more advanced students who require less supervision and are more productive. Partly because hospitals are reluctant to provide training, and partly to introduce students to the practice sites in which they are likely to be employed, more non-hospital settings are being used for clinical training (Mathematica, 1987). In the future constraints on growth in the supply of physical therapists are more likely to rise from problems in finding qualified faculty and training sites than from lack of student demand.

Currently, facilities trying to hire physical therapists are finding it very difficult. For the whole period of the study the committee heard more reports of pressure in the labor market for physical therapists than for any other allied health group. Often it appears that hospital recruitment difficulties are due to the inability of institutions to compete with the earnings available to therapists in other settings or private practice. A solution is sometimes found in contracting for physical therapy services. In these cases there is not a "shortage" in the sense of therapists not being available at a price the facility is willing to pay, but "stress" in the sense of facilities having to alter their way of operating to accommodate the changing market.

The sense of acute shortage that the committee heard from many sources (including representatives of national organizations, which suggests that this was not merely a local phenomenom) is supported by some admittedly limited evidence. Statewide surveys of North Carolina health care facilities reported an almost doubling of the vacancy rate for staff physical therapists from 13.8 percent in 1981 to 26.9 percent in 1986. Vacancies for assistants more than doubled from 8 percent to 20 percent (North Carolina Area Health Education Centers Program, 1987c). These 1986 vacancy rates were higher than the rate for five of the six other allied health fields surveyed. Only occupational therapy had a higher vacancy rate at 25.1 percent in 1986 (North Carolina Area Health Education Centers Program, 1987c).

Conclusion

If the education system continues to produce physical therapists at the current rate and the labor force behavior of therapists does not change, some major adjustments will have to occur to prevent a shortage of physical therapists to the year 2000. Shortages affect different parts of the health care system differently. Sectors that pay more or have more attractive working conditions are likely to feel the impact less. Sectors unable to hire a sufficient number of therapists because they cannot outbid the higher payers, will be forced to reduce services. This could create an access problem for some patients—probably those in need of long-term rehabilitation services and elderly people.

The needed market adjustments are likely to be made by both the education and employment sectors, with employers leading the way because they are the first to feel the impact of tight labor markets. Since student interest in a physical therapy career is already higher than educational capacity can accommodate, salary increases will not be the most effective way of bringing new people into physical therapy. However, more pay should be effective in drawing back into the labor force those who have left, and in encouraging practitioners to remain active. Salaries are likely to increase and hospitals and other employers are expected to seek more productive and effective ways of employing therapists, and reduce their demand somewhat. Extended tenure in the labor market should contribute to the needed adjustment. As salaries rise, and if independent practice and professional growth opportunities increase, practitioners can be expected to remain in the labor force longer and return more readily after leaving. Changes of this sort make major contributions to relieving labor market stresses.

Employers concerned with enhancing the supply of physical therapists should begin to understand that the costs of participating in the clinical component of education programs will outweigh the costs of adjusting to both lower levels of physical therapy use and the major salary increases needed to attract therapists. If this and other adjustments occur, graduations will eventually increase, and, as the supply of new therapists responds to demand, the rate of salary increase will abate and a balance between demand and supply will be found.

If, as some desire, a master-level degree becomes the entry level requirement the supply of new practitions would be more constrained. Whether raising the entry level degree would also increase salaries and reduce demand for therapists is a topic of contention. Some say that higher levels of professional training require greater compensation for the greater educational investment and are thereby linked to higher costs of care, and smaller amounts of care in times of cost containment (Havinghurst, 1987). But the American Physical Therapy Association believes this argument is wrong for several reasons; more educated practitioners are more likely to work independently with fees that are no higher than charges assessed by institutions that employ therapists—and even if therapists were more highly paid, the cost of a $3,000 salary increase to full-time salaried physical therapists in hospitals would represent less than half of one percent of the average annual increase in hospital care expenditures (American Physical Therapy Association, 1987c).

Radiologic Technologists & Technicians

Demand for Radiologic Technologists and Technicians

The BLS estimates that between 1986 and the year 2000 the number of jobs for radiologic technologists and technicians will grow by 65 percent, from 115,000 to 190,000. This high rate of growth is similar to that expected for dental hygienists and it exceeds the expected job growth for dietitians, speech-language pathologists and audiologists, and occupational therapists. Jobs for nuclear medicine technologists, who are excluded from the BLS definition of radiologic technologists and technicians, are expected to increase by nearly 23 percent, from 9,700 to 11,900.

The BLS analysts evaluate job opportunities in the many different jobs encompassed in radiology. These include sonography, fluoroscopy, mammography, computerized tomography, magnetic resonance imaging and radiation therapy. Two of the more specialized fields with distinct accreditation for educational programs include radiation therapy and sonography.

In addition to analyzing the prospects for each specialty, the BLS analyzes growth of jobs in different settings—predicting increasing employment opportunities in non hospital settings such as physician offices (where 27.4 percent were employed in 1986 and almost 38 percent are expected to be employed in 2000), HMOs, and imaging centers.

Hospitals are today the major employers of radiologic technologists and technicians, supplying a little over 60 percent of available jobs (see Table 4.7). The BLS predicts that by 2000 only 48 percent of jobs will be in hospitals. This does not mean, however, that the number of hospital jobs will fall—only that the rate of increase in hospitals will be below the rate of job growth in other settings. Indeed, the BLS expects the number of hospital jobs to increase by 21,400 from 70,200 in 1986 to 91,600 in 2000. A similar pattern is predicted for nuclear medicine technologists (see Table 4.8). The change under PPS of inpatient radiology departments from revenue center to cost center, and increased use of utilization review was expected to result in reduced use of ancillary services, especially diagnostic imaging (Steinberg, 1985). The pre- and post-PPS employment pattern in hospitals appears to offer equivocal support for this notion.

According to AHA data, employment of x-ray technologists, radiation therapy technologists and nuclear medicine technologists declined between 1983 and 1985, compared with the years 1981-1983 when employment had risen or been close to stable. For other radiologic personnel employment had been falling before PPS, but the rate slowed after PPS (American Hospital

TABLE 4.7: Radiologic Technologists' and Technicians' Major Places of Wage and Salary Employment, 1986 and 2000 Projected

	Number of Jobs 1986	Percent[1]	Number of Jobs 2000	Percent[1]
Total Employment[2]	115,400		190,100	
Total Wage & Salary Employment	114,400	100.0	188,200	100.0
Hospitals, public and private	70,200	61.4	91,600	48.7
Outpatient care facilities	2,500	2.2	9,400	5.0
Offices of physicians	31,300	27.4	71,000	37.7
Offices of dentists	1,200	1.0	1,900	1.0
Offices of other health practitioners	1,500	1.3	4,000	2.1

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics. 1987. "Employment by occupation and industry, 1986 and projected 2000 alternatives." Moderate alternative. (Unpublished.)

[1] Percentages were calculated using unrounded figures and will therefore not be identical to percentages that may be calculated using the rounded figures provided above.

[2] Total Employment = wage and salary employment + self employment. Includes 1,000 self-employed workers in 1986 and 1,900 in 2000 who are not allocated by industry.

TABLE 4.8: Nuclear Medicine Technologists' Major Places of Wage and Salary Employment, 1986 and 2000 Projected

	Number of Jobs 1986	Percent[1]	Number of Jobs 2000	Percent[1]
Total Employment[2]	9,700		11,900	
Total Wage & Salary Employment	9,700	100.0	9,700	100.0
Hospitals, public and private	8,600	88.6	10,000	83.9
Medical and dental labs	500	5.2	700	6.1
Offices of physicians	400	4.1	800	6.6

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics. 1987. "Employment by occupation and industry, 1986 and projected 2000 alternatives." Moderate alternative. (Unpublished.)

[1] Percentages were calculated using unrounded figures and will therefore not be identical to percentages that may be calculated using the rounded figures provided above.

[2] Total Employment = wage and salary employment + self employment. Self-employed persons are not allocated by industry.

Association, 1985 and 1987). It is difficult to ascertain exactly what changes are occurring. In a 1985 survey of nuclear medicine department directors, administrators, or chief technologists, 20 percent of the respondents reported a decline in the number of nuclear medicine technologists employed, 65 percent reported a decrease in inpatient volume and 58 percent reported an increase in outpatient volume. These data were interpreted as resulting from lowered admissions, physicians ordering fewer tests and routine testing shifting to the outpatient setting (Crucitti and Pappas, 1986).

A more widely based 1985 survey of hospital radiology by the American Hospital Radiology Administrators (Conway, 1985) asked whether volume had increased, decreased, or remained stable in 33 procedures. Over 40 percent of respondents reported decreases in three types of procedures including skull and gastrointestinal imaging. By contrast over 40 percent of respondents reported increases in 17 procedures including various fluroscopy studies, cardiac catheterization, cardiac ultrasound, various CT studies and radiotherapy treatments. The overall findings echoed those of the nuclear medicine survey with 66 percent reporting a decrease in inpatient workload and increases in outpatient clinic and private workloads reported by 44 and 57 percent of respondents respectively. Radiology services appear to reflect a generally observed pattern of post PPS utilization—declining dramatically in the two years after PPS was introduced and turning up again in 1985 and 1986. Factors that limit further staffing reductions include increased severity of illness, reduced opportunity to shift the patient to an outpatient setting, and less opportunity to cut unnecessary services (Prospective Payment Assessment Commission, 1987). Looking to the future the aging population and its need for more intensive care together with the existing upward trends in radiologic usage point to continued increases in demand for radiologic personnel.

The types of personnel likely to be in demand in the future depend to some extent on technological changes. However, it is difficult to estimate the impact and rate of such changes. The emergence of new imaging modalities such as MRI and positron emission tomography or, going back to the 1970s, the new application of computer technology to imaging, has generated major improvements in diagnostic capabilities. The new technologies have not always supplanted the old, rather the new imaging procedures often are used after more customary work is inconclusive. The new imaging technologies are labor intensive. Scanning procedures are more time consuming than film x-rays. Whether the rate of diffusion of future new imaging modalities will be as great as in the past is an open question. Payers have an interest in controlling the spread of expensive innovation. Many will remember attempts to limit the numbers of CT machines through certificate-of-need review. Today facilities will be more reluctant to buy expensive equipment unless it is believed to be cost-effective or represents a significant improvement in patient care.

Employment outside the hospital is expected to be an increasing source of demand for radiologic technicians and technologists. Free-standing imaging centers, started by physicians developing a "niche" in the health care market, are already seen as luring technologists away from hospitals. HMOs and group practice are providing on-site radiology. Physicians increasingly provide x-ray capability in their offices. Although in some states nonlicensed personnel may operate x-ray equipment in low volume settings, in others only licensed personnel may do so. Indeed, licensing provisions will be a significant force influencing demand for radiologic personnel. For example, in some states ambulatory care centers which hire personnel to carry out two functions must hire licensed x-ray technicians rather than laboratory technicians to provide both x-ray and lab services because provision of x-ray services requires that a licensed technician operate the equipment. A committee site visit revealed that newly enacted licensing laws generated a sharp spurt in demand for technicians when licensed personnel had to be hired to replace unlicensed personnel. As a result, even an employer who was willing to offer substantially increased pay was unable to attract job applicants.

Another force that could sustain a high level of demand for radiologic personnel is public knowledge and valuation of x-ray procedures. Media attention to imaging has developed public consciousness — and this together with physician appreciation of the available diagnostic capabilities should ensure that demand is sustained. Thus, demographic trends, technological trends in hospital care as well as outpatient care, and other forces will combine to continue sustained high demand for radiologic occupations. The BLS' estimated 65 percent increase in jobs to 2000 seems reasonable.

Those interested in tracking future demand for radiologic technicians and technologists should monitor the following factors:

- hospital utilization - especially intensity of care and case mix
- growth of all types of free-standing facilities
- licensure changes
- technological changes likely to cause new areas of specialization
- results of technology assessment.

Although recent financing changes have had less impact on radiology than some expected, the financing changes envisioned in our three scenarios described in Chapter 3 could have a marked effect.

Scenario One — Mixed Model

Overall growth in the health care sector, faster growth in outpatient care, and public and physician appreciation of diagnostic imaging combine to generate prolonged growth in demand for radiologic technicians and technologists.

Scenario Two — Prospective Payment

The rate of growth of demand for radiologic technicians and technologists in hospitals will slow as admissions fall but intensity of care increases for an older and sicker patient population. The use of imaging as an aid to speedy diagnosis and speedy discharge will be encouraged. Demand from outpatient setting will increase, both from a transfer of procedures out of hospitals and from an increase in free-standing facilities. In all settings productivity pressures squeeze demand.

Competitive pressures will force managers of managed care systems to seeklthe most productive sites for radiologic referral. Hospitals and imaging centers will limit staff in order to price services competitively.

Scenario Three - Access

Because imaging of one sort or another is used in almost all types of health care—primary through tertiary—and by many medical specialties, the increased use of health services that would result from a policy to improve access would inevitably produce increased utilization of radiology services. Even if such a policy is accompanied by utilization controls, such as case management, it is difficult to believe that anything other than a major increase in demand for radiologic personnel would occur.

The Supply of Radiologic Technologists and Technicians

Accompanying a long-term shift from hospital-based to college-based programs, the number of radiography education programs has decreased 23 percent over a ten-year period. For several years the changing location of programs did not affect the number of graduates substantially. But a sudden decline of about 15 percent in graduations has occurred recently from 7,393 in 1985 to 6,400 in 1986 (Committee on Allied Health Education and Accreditation, 1987a). This may be the result of potential students responding to fears of reduced demand generated by prospective payment.

Two smaller and newer radiologic specialties—nuclear medical technology (NMT) and radiation therapy technology (RTT)—show a different pattern from each other. After rapid growth in the 1970s, NMT experienced a 25 percent decline in graduations between 1984 and 1986. By way of contrast, RTT graduations show slow but sustained growth over the past two decades (Committee on Allied Health Education and Accreditation, 1987a).

There are indications that radiologic technologists, especially those with specialized training, are finding jobs easily. Hospitals are competing with free-standing employers for scarce personnel (Mathematica, 1987), and the committee's site visits found some employers unable to hire the staff they were seeking. Other data suggest that if employers are having a hard time hiring radiologic staff this may be a phenomenon of very recent occurrence. A 1986 survey of health facilities in North Carolina reports that the overall vacancy rate for radiologic personnel at 8 percent was very low compared to other allied health fields — for example 11.9 percent for medical record administrators and 17.9 percent for respiratory care (North Carolina Area Health Education Centers Program, 1987d).

Finally, adding to the impression of a field in which employers are starting to have difficulty in hiring, is the result of a survey of education program directors. The percentage who believe that radiography is an attractive opportunity increased from 60 percent in 1981 to 89 percent in 1987 (Parks and Hendrick, 1988).

Conclusion

Even if the decline in graduations from radiologic education programs is halted, strong adjustments in the labor market will be needed to avoid a shortage of practitioners through 2000.

Salary adjustments are key in any strategy designed to alleviate labor market stresses. Salary increases can attract new entrants to the field, encourage the return of those who have left, and prolong the attachment to the field of those already in it. Future supply is highly sensitive even to small increments in any or all of these variables.

The committee believes that early and significant action in this field is needed to forestall serious problems in the future delivery of health services.

Focusing on salary increases could be particularly productive in this field. Although starting salaries are competitive, radiologic technicians are later less well compensated than, for example, computer programmers and operators, and engineering technicians—fields that may be competing for the same students (University of Texas Medical Branch, 1986). Education program directors more often believe that radiographic graduates are more inappropriately compensated than other comparable allied health graduates, except those who work in laboratories (Parks and Hendrick, 1987).

Health care providers play a particularly important role in generating an adequate supply of radiologic personnel. Many education programs are hospital based, and all are heavily dependent on health care facilities to open clinical training opportunities to students. Because of the expense of equipment and the impossibility of simulating patient contact, academic institutions must maintain close ties with clinical sites. Despite such costs as decreased productivity, increases in repeat tests, and faculty salaries, health care providers should not underestimate their importance in securing a continuous supply of personnel for themselves as well as other providers.

Respiratory Therapists

Demand for Respiratory Therapists

The BLS predicts that by 2000 there will be 75,600 jobs for respiratory therapists—an increase of 34 percent over the 56,300 jobs available in 1986. This growth is substantially higher than will occur in total national employment (19 percent), and in some allied health fields such as clinical laboratory technologists or nuclear medicine technologists. However, the growth is moderate when compared with physical therapist and medical record technicians for whom growth is expected to exceed 70 percent, and occupational therapists and radiologic technicians and technologists for whom the BLS expects growth in jobs to 2000 to exceed 50 percent.

The BLS estimate of 34 percent growth to the year 2000 is based largely on an assessment of how respiratory therapists will fare in the hospital setting, where almost 88 percent were employed in 1986. Although BLS predicts only a 12.2 percent increase in overall hospital employment to the year 2000, their analysts expect hospital demand for respiratory therapists to increase by 25 percent because of increased admission of older and sicker patients who require more intensive care. BLS also sees demand for respiratory therapy being generated by improvements in trauma care that allow more accident victims in need of ventilator care to survive. The development of small ventilators for low birth weight neonates is a technological factor in increasing demand for respiratory services in hospitals. BLS foresees increasing specialization within the profession as therapists become more expert in such areas as neonatal and cardiac care. Simultaneously, respiratory therapists are also expected to become multi-competent, moving into such areas as electrocardiography (EKG) which would allow hospitals to curtail the employment of EKG staff for 24 hours per day by using the already-present respiratory therapists. Thus BLS analysts expect nearly 82 percent of the 75,600 respiratory therapist jobs will be in hospitals in the year 2000 (see Table 4.9).

The outlook for increased employment of respiratory therapists in home health agencies is not viewed optimistically by the BLS analysts who expect reimbursement policies to prevent significant expansion of home care opportunities for respiratory therapists.

Medicare reimbursement policies for respiratory therapy in the home, under the current political and financing climate, support the BLS notion that by and large future employment will be generated mainly in hospitals. The services of respiratory therapists are not reimbursable by Medicare on a per visit basis. Rather, the costs must be included in administrative expenses. Thus employment by home health agencies is low with the respiratory therapist more often retained as a consultant to staff making home visits. Of 214 home health agencies surveyed, only 12 employed a respiratory therapist either as staff or as a contracted consultant (Health Care Financing Administration, 1986b). A recent report to Congress answered the question of whether Medicare should expand coverage to include respiratory therapists' visits in the negative. The report noted that nurses, who are covered on a per-visit basis, can treat

TABLE 4.9: Respiratory Therapists' Major Places of Wage and Salary Employment, 1986 and 2000 Projected

	Number of Jobs 1986	Percent[1]	Number of Jobs 2000	Percent[1]
Total Employment[2]	56,300		75,600	
Total Wage & Salary Employment	56,300	100.0	75,000	100.0
Hospitals, public and private	49,400	87.7	61,900	81.8
Outpatient care facilities	700	1.2	1,500	2.0
Offices of physicians	500	.9	1,100	1.5
Offices of other hlth practitioners[3]	2,000	3.5	3,300	4.3
Other health and allied health services[4]	3,400	6.1	7,300	9.7

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics. 1987. "Employment by occupation and industry, 1986 and projected 2000 alternatives." Moderate alternative. (Unpublished.)

[1] Percentages were calculated using unrounded figures and will therefore not be identical to percentages that may be calculated using the rounded figures provided above.

[2] Total Employment = wage and salary employment + self employment. Self-employed persons are not allocated by industry.

[3] Offices of health practitioners other than physicians (including osteopaths) and dentists.

[4] Health services other than offices of physicians, dentists and other health practitioners, nursing and other personal care facilities, hospitals, medical and dental laboratories, and outpatient facilities.

many patients who are in need of respiratory care, and can be specially trained if necessary. Little evidence was found that hospital stays would be reduced by expanded payment for home care services, and although many Medicare beneficiaries can be helped by respiratory care, existing levels of services were deemed sufficient (Health Care Financing Administration, 1986b). Respiratory equipment and supplies for use at home are covered by Medicare under the durable medical equipment benefit. Equipment supply companies support home patients by hiring professional staff such as respiratory therapists who can supervise installation and undertake patient education. (The American Association of Respiratory Care has reportedly had difficulty in tracking employment in durable medical equipment companies.) Despite perceptions that increasing numbers of patients could benefit from respiratory therapy services in their homes (see for example Gilmartin and Make, 1986), unless reimbursement changes, respiratory therapists are unlikely to experience significant increases in home care work.

A 1986 study by the American Association for Respiratory Care provides tentative support for the BLS view that respiratory therapy employment in hospitals has the potential to grow at a faster rate than overall hospital employment, once productivity gains have improved to their limits. The association surveyed hospitals and educators to evaluate the impact of PPS. The survey found that since 1983, hours of respiratory care services increased in over half of surveyed hospitals, and admissions of patients with respiratory related diagnoses stayed the same or increased in 70 percent of hospitals. However, in respiratory therapy departments the personnel budgets and employment were generally either stable or decreased (American Association for Respiratory Care, 1986a) suggesting that improvements in productivity occurred.

Other changes occurring within hospitals can generate continued steady employment growth for respiratory therapists. As suggested by the BLS, respiratory therapists are increasingly being used to provide non-respiratory care services (American Association for Respiratory Care, 1986b). In one hospital visited by the committee, respiratory therapists reported expanding into cardiopulmonary areas such as the cardiac catheterization laboratory, increasing their activity in hemodynamic monitoring and filling in on EEG and EKG services. The aging population is also likely to increase admissions of patients with cardiopulmonary disease and dysfunction. Chronic obstructive pulmonary disease and lung cancer exemplify diseases to which elderly people are particularly prone.

Countering these upward movements are downward pressures that could occur if researchers and managers look more critically at services. A 1986 editorial in the New England Journal of Medicine (Petty, 1986) noted that in the shift to PPS respiratory therapy was targeted "as a likely example of undisciplined practices and excesses for reasons that included a dearth of good scientific data on many techniques in common use". Noting studies showing evidence of the effectiveness of some therapies, as well as one study indicating that sometimes respiratory therapy can be reduced without affecting outcome, the editorial concludes with a call for an improved scientific data base to guide practice.

The extent to which respiratory therapy is vulnerable to reduction in times of constraint will depend only in part on evidence of necessity or effectiveness. Other important factors include an absence of patient demand for therapy services and the strength of department managers in each hospital's hierarchy. It was noted on a site visit that although the volume of respiratory therapy has diminished outside of intensive care units (ICUs) because of more stringent utilization review and improved use of medications, simultaneously ICU activity has shown large increases with sicker patients needing ventilation care.

In sum, the BLS analysis of moderate growth in jobs for respiratory therapists is well substantiated. Hospital employment is the chief source of growth, stimulated by the aging population and demand generated by the technologies that save extremely sick individuals. Out-of-hospital employment is small and likely to remain so. Even a large increase in non-hospital demand would have only a small effect on total demand for respiratory therapists.

Factors that will have an important effect on employment of respiratory therapy include:

- hospital admission rates
- severity of hospital admissions
- disease patterns, especially cardiopulmonary diseases
- the outcome of effectiveness studies
- the expansion of activities of respiratory therapists into new areas
- medicare reimbursement of respiratory therapists in home care
- employment by the durable medical equipment industry
- expanded use in nursing homes.

The last three factors can diminish the dependence of the profession on hospital employment. However, because an explosion of out-of-hospital employment is unlikely, growth of jobs will continue at a moderate rate as forecasted by BLS.

While the above are the factors that should be tracked to identify trends in demand for respiratory therapists, major financing changes, as outlined in the scenarios in Chapter 3, will also have major impacts.

Scenario One — Mixed Model

Growth in hospital employment will continue to be moderate, fueled largely by the aging population. Employment in home care will increase only very slightly as reimbursement constrains home visits. Employment in other settings will continue to be minimal, so that hospital growth will overwhelm other changes.

Scenario Two — Prospective Payment

Increased use of prospective payment will force hospital administrators to seek out ways of reducing costs as hospital utilization falls. Respiratory therapy is likely to be vulnerable unless shown to aid in early discharge. Hospitals will also seek to increase their stake in non-hospital markets to ensure that, after earlier discharge, patients' continuing care produces revenue for the hospital. Hospitals will become purveyors of more intensive home care, including respiratory therapy in modest amounts. Employment by durable medical equipment companies will increase as they provide more intensive out-of-hospital services. However, contraction of employment in the hospital sector will overwhelm all other effects.

Scenario Three — Access

The greatest increase in demand for respiratory therapists will occur with this scenario. Hospital use will be stimulated by making financing available for people who are today unable to obtain such care. However, some of the hospital expansion will occur in "elective" procedures which are today postponed for lack of financing until sickness is acute. These less acutely sick patients are less intense users of respiratory therapy services than are sicker patients.

Supply of Respiratory Therapists

The characteristics of today's respiratory therapy workforce reflect the multiple routes of entry into the field that have existed but are now disappearing. Analyses of the 1980 census indicate that a significant proportion of the workforce, including credentialed personnel, had only on-the-job training (Health Resources and Services Administration, 1984). There is now a trend toward training in programs that culminate in certification and/or licensure. As a result the shorter programs providing training for the lower-level respiratory technicians are diminishing. The number of accredited technician programs has decreased by 2.3 percent, from 173 in 1980 to 169 in 1986. The number of graduates has decreased by 21 percent, from 3,206 in 1980 to 2,539 in 1986 (Committee on Allied Health Education and Accreditation, 1987a).

Accompanying the move to certified personnel, sponsorship of educational programs has shifted from hospitals to colleges and universities. Community colleges offer the greatest proportion (66 percent) of programs. The number of accredited therapist programs has increased by 34 percent, from 175 in 1980 to 235 in 1986. But the number of graduates has not shown parallel growth. Rather it has fluctuated from year to year with a high of 3,868 in 1985 followed by a six year low of 2,740 in 1986 (Committee on Allied Health Education and Accreditation, 1987a). This suggests that during low years excess educational capacity exists. Furthermore, the trend in graduates bears watching to determine whether the 28 percent drop in graduates between 1985 and 1986 is other than an anomaly.

The committee has heard conflicting reports of the availability of respiratory therapists, suggesting that there are substantial differences among local markets. Salary data are equivocal in their support of the notion that the labor market may be very tight. At least two data sets allow comparison of the rate of salary increases among some allied health professions—the Bureau of Labor Statistics' Current Population Survey, and the University of Texas' National Survey of Hospital and Medical School Salaries. In one of these two data sets, the salaries of respiratory therapists showed the greatest rate of increase. In the other, the rate of salary increase for respiratory therapists fell in the bottom third when compared with rates of increase for 19 other groups of hospital employees (Current Population Survey; University of Texas, Medical Branch, 1981 and 1986). These data do not allow any firm conclusion about the present state of the market for respiratory therapists.

Conclusion

If the number of graduations from education programs can be maintained at approximately today's level the nation's supply of respiratory therapists should be adequate for demand through the year 2000. This implies that significant changes in the rate of salary growth, or major improvements in the conditions of employment should not be expected. To maintain this balance, education capacity and student interest must be sustained. The fluctuations in graduations suggest that students may need encouragement in the form of increased job attractiveness to keep up the level of interest.

Some caveats about the committees' estimate of the balance between supply and demand are in order. The committee in assessing future supply assumed that respiratory therapy workforce behavior will be comparable to the workforce behavior of members of other therapy fields. Unlike many allied health fields, men represent a substantial proportion (about 40 percent) of the respiratory therapy labor force. The significance of this in terms of geographic mobility, labor force attachment, or responsiveness to economic incentives—as compared with fields in which almost all the workers are women—is not fully known. If men remain in the labor force longer than women, the committee's estimate of future supply may be conservative.

In conclusion, until better information about the long-term labor force behavior of respiratory therapists is available, it is reasonable to believe labor markets will smoothly make the adjustments needed to maintain a reasonable equilibrium between supply and demand for respiratory therapists. However, the volatility of the number of graduations suggests the need for close monitoring of emerging education trends.

Speech-Language Pathologists and Audiologists

Demand for Speech-Language Pathologists and Audiologists

The BLS predictions of an additional of 15,500 jobs for speech-language pathologists and audiologists by the year 2000 represents an increase by 34 percent to 61,000 jobs. BLS estimates that 45,100 jobs existed in 1986 including jobs in education that were in some cases filled by individuals with baccalaureates, rather than the professional entry level masters degree. The American Speech-Language-Hearing Association (ASHA) estimated that 42,390 of its members--all of whom hold at least a master degree--were in the active workforce. Non-ASHA members in the active workforce, including people with only a bachelor degree, were estimated to number 41,000. Thus the association estimates a total of 83,000 people in speech-language and audiology jobs--vastly higher than the BLS estimate of jobs.

The growth rate to the year 2000 predicted by the BLS is similar to that predicted for occupational therapists and stems from a similar factor unusual among allied health practitioners--significant employment outside the health care system. In 1986 only 28.6 percent of speech-language pathologists and audiologists jobs were in the health services industry. Sixty-four percent were in educational services--a sector in which the BLS expects demand to be close to stagnant (see Table 4.10). Between 1986 and 2000, speech-language pathology and audiology jobs in the education sector are expected to increase by only 14 percent. The American Speech-Language-Hearing Association notes that 13.6 percent of speech-language pathologists and audiologists report that they run their own practice or are independent contractors (American Speech-Language-Hearing Association, 1988).

BLS analysts caution that their classification of speech- language pathologists and audiologists includes those prepared only to the bachelor level. These practitioners are not certified by the American Speech-Language-Hearing Association, which certifies at the master degree level and above, and cannot work in the 36 states with licensure requirements. BLS analysts believe that most non- ASHA-certified personnel are employed in educational services by state education departments in states that certify individuals who have only a bachelor degree or who lack other qualifications for ASHA certification.

There is considerable support for the BLS estimates. Although speech-language pathologists and audiologists are provided with new opportunities for growth under the 1986 Education of the Handicapped Act which increased demand by funding programs for young children, total growth of employment in education will be relatively slow. However, new employment opportunities will occur in other settings. Speech-language pathologists and audiologists are well positioned to benefit from changes occurring in the health system. Their lesser dependence on hospital employment (only 10 percent of jobs in 1986) makes them less vulnerable to any squeeze on employment in that sector. Their reimbursement status positions them to benefit from shifts to care outside of hospitals. Under the Omnibus Reconciliation Act of 1980, a speech-language pathologist may develop a plan of care for patients referred by a physician and be reimbursed by Medicare. Prior to 1980 the amount, duration and scope of services had to be specified by the physician. Since 1986, speech-language pathology is among the therapies that must together be provided for a total of three hours per day for a beneficiary to be eligible for Medicare coverage in the inpatient rehabilitation facility. While this could provide an impetus to increased demand for speech-language pathologists, it could be short lived as Medicare seeks ways to find an equitable reimbursement system that includes cost control incentives. Medicare will also reimburse for home care visits—a provision that positions therapists to care for the growing population of patients discharged from hospital or in need of long-term home care (American Speech-Language-Hearing Association, 1987b). According to the Health Care Financing Administration the estimated number of speech-language pathologists employed by Medicare certified home care agencies grew from 303 in 1983 to 5,503 in 1985, but dropped to 3,113 in 1986 (American Home Care Association, 1987). The extent to which this drop is due to increased contracting or other arrangements is not known. Approximately 48 percent of free standing home health agencies offer speech-language and audiology services (Task Force on Home Care, 1986).

Although only a minority of speech-language pathologists and audiologists are employed in hospitals, their use in that setting has not been negatively affected by PPS. Between 1983 and 1985 their FTE employment in hospitals increased by 21 percent from 2,684 to 3,252. Committee site visits uncovered several possible reasons. One is expanded speech and hearing coverage by HMOs. Audiology personnel working in hospital outpatient areas are finding that HMO patients are covered for the full range of diagnostic testing and hearing aids. Previously, commercial insurance subscribers had only a narrow range of hearing testing covered. Speech-language pathologists also cited growing demand for services for stroke and head injured patients whose survival rates have improved. Audiologists noted a growing incidence of hearing defects in young people who listen to music through headphones. Both occupations cited the growing numbers of elderly patients using their services plus an increasing understanding of their services by physicians, which results in more numerous referrals.

In sum, speech-language pathology and audiology in their major employment setting—educational institutions—are not likely to experience rapid increases in demand. In health care settings, they are positioned for steady growth. Reimbursement allows them to take advantage of the shift to non-hospital care in many settings. Given the expected slow growth in education, and faster growth in health care settings, the overall moderate growth predicted by the BLS seems reasonable.

Factors to be monitored by those wanting to track future demand for speech-language pathologists and audiologists include:

- medicare reimbursement of rehabilitation services
- school systems growth and financing
- patterns of specific diseases and treatment such as stroke, head trauma and deafness in youth
- growth in independent practice opportunities and contractual arrangements with free-standing speech-language pathology and audiology organizations.

The way in which the three scenarios described in Chapter 3 play out for speech-language pathology and audiology is largely determined by the scattering of employment across health care settings and outside the health care system.

Scenario One -- Mixed Model

The speech-language pathologist and audiologist are in steady demand as their services are included in comprehensive HMO benefits packages, and increasing numbers are needed to work in the less productive home care environment. Demand in rehabilitation and outpatient services also shows steady growth.

Scenario Two -- Prospective Payment

Because only a small proportion of speech-language pathologists and audiologists work in hospitals the impact of increased prospective payment in this setting has little impact on total demand. Similarly, bringing rehabilitation services under prospective payment results in only a small reduction in overall demand. Outpatient care will show overall growth, but speech-language and audiology will not benefit greatly as these services will be regarded as less vital than other services relating more directly to physical health. Less vital services will be most vulnerable to reduction under prospective payment. Putting together the slight growth in outpatient demand and the reduction in inpatient demand yields stagnant total demand from the health care sector under this scenario.

TABLE 4.10: Speech-Language Pathologists' and Audiologists' Major Places of Wage and Salary Employment, 1986 and 2000 Projected

	Number of Jobs 1986	Percent[1]	Number of Jobs 2000	Percent[1]
Total Employment[2]	45,100		60,600	
Total Wage & Salary Employment	42,100	100.0	56,500	100.0
Education institutions, public and private	27,000	64.0	30,800	54.62
Hospitals, public and private	4,400	10.4	5,600	9.9
Outpatient care facilities	2,700	6.4	4,400	7.7
Nursing and personal care facilities	1,200	2.7	1,900	3.4
Offices of physicians	1,800	3.6	2,900	5.2
Offices of other hlth practitioners[3]	1,200	2.7	4,400	7.7

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics. 1987. "Employment by occupation and industry, 1986 and projected 2000 alternatives." Moderate alternative. (Unpublished.)

[1] Percentages were calculated using unrounded figures and will therefore not be identical to percentages that may be calculated using the rounded figures provided above.

[2] Total Employment = wage and salary employment + self employment. Includes 3,000 self-employed workers in 1986 and 4,096 in 2000 who are not allocated by industry.

[3] Offices of health practitioners other than physicians (including osteopaths) and dentists. Includes offices of self-employed speech-language pathologists and audiologists.

Scenario Three — Access

Speech and hearing deficits are among the group of health problems likely to go unserved if individuals experience financial barriers to care. Under this scenario financial barriers are lowered and previously ignored communicative deficits will receive attention, stimulating demand for speech and hearing services in inpatient and outpatient settings.

Supply of Speech-Language Pathologists and Audiologists

In 1986 304 programs offered degrees in communication sciences and disorders. Of these 21 percent offered only undergraduate degrees. The total number of programs has been quite stable ranging between 293 and 304 since 1983 (Cooper et al. 1987).

The number of bachelor degrees has declined by 15 percent to 4,300 since 1981. However, the decline was confined to two years. The latest figures show an upturn (Committee on Allied Health Education and Accreditation, 1987a).

The picture for master degrees is a little clearer. The number of those degrees awarded has remained relatively stable since 1982. But this must be viewed together with the bachelor degree graduates (Cooper et al. 1987). Approximately 90 percent of masters degree graduates in speech pathology and audiology have undergraduate degrees in these same disciplines. Furthermore, the number of masters' degree graduates closely matches the undergraduate degrees in speech and audiology, with a two-year time lag. (Cooper et al., 1988). Therefore we conclude that most speech-language or audiology undergraduates move on to a speech-language and audiology master degree, and that bachelor degree graduates represent the pool from which the therapists are drawn. Thus we must pay attention to the undergraduate as well as graduate degrees as an indicator of future supply.

The committee is not aware of any evidence that supply and demand are not currently in balance. Although the committee occasionally heard that rehabilitation facilities were having difficulties filling vacancies for speech-language pathologists, they also heard that some independent practitioners were unable to generate enough business and are returning to employment in facilities. Such comments were rare and do not disturb the overall picture of an adequate current supply of practitioners. A national survey of starting salaries for speech-language pathologists in hospitals show an increase of 23 percent between 1981 and 1986. This was lower than the increase for 17 of 19 other types of personnel. The 33 percent increase for audiologists, however, was higher than that of pharmacists and nurses who are thought to be in short supply (UTMGB, 1981 and 1986). These data indicate a difference in demand for the two types of practitioners, but are not in themselves sufficient evidence on which to base a judgment of the markets.

Conclusion

If baccalaureate graduations are maintained at approximately the level of the last few years, and if most of these graduates go on to master degrees in speech-language pathology or audiology, there should be a continued balance between supply and demand to the year 2000. This implies that significant changes in the rate of salary growth, or major improvements in the conditions of employment should not be expected. However, the production of baccalaureate graduates should be carefully monitored. The data to this time do not indicate whether a downward trend is starting. If this does occur employers who feel the impact of the drop will need to adjust to factors that influence people making decision about careers in language and hearing disorders.

Conclusion

This chapter applies the best available data to make assessments of how the forces that drive supply and demand for allied health personnel will impact on allied health labor markets. Our intention is to alert decision makers to the kinds and magnitudes of market adjustments that they should expect and encourage in order to sustain a long-term balance between supply and demand for allied health personnel.

For some fields such as physical therapy, radiologic technology, medical record technology and administration, and occupational therapy, we foresee a need for decision makers to use the mechanisms under their control to improve the working of the market so that severe imbalances in supply and demand may be prevented. Employers are already concerned about difficulties in hiring in some of these fields, and there are signs that health care providers are beginning to find some painful as well as some benefical ways of accommodating new realities. The committee is concerned that inaction may have consequences that would have deleterious effects on the level of health care.

For some other fields, such as clinical laboratory technology and dental hygiene there are factors that could cause instability in both supply and demand. For these fields the market is more likely to make the needed adjustments and serious disruptions are less likely to occur. However, in both of these fields there are unresolved issues concerning the match between tasks and levels and types of education. The way these issues are resolved could determine whether major imbalances will occur.

Supply and demand for speech-language pathologists, audiologists, respiratory therapists, and dietitians are expected to be sufficiently well balanced for the labor market to make smooth adjustments. The kinds of incremental adjustments that make careers attractive and the ways in which personnel are deployed appear likely to maintain a state of equilibrium over time. Nevertheless, changes in factors we have identified as having major impacts on supply and demand could cause disequilibrium. These factors should be monitored.

These conclusions about the future outlook refer to the long term. For all fields there are likely to be periods of greater and lesser imbalance between now and the year 2000.

It is the nature of markets to eventually adjust to change. Projected imbalances in supply and demand do not mean that shortage or surplus will occur. Rather, they signal that employers and potential employees must, and probably will, make adjustments. Only rarely do markets not accommodate changes in supply and demand through a variety of adjustment mechanisms.

We have identified areas for potential adjustment both in supply and demand. This forms a basis for understanding the future policy directions concerning supply and use of allied health personnel. The objective of policy is to make less painful and costly the process of adjustment. Decrements in quality of care, interruption or reductions of service, and curtailment of investment in new technologies and organizational forms (such as home care or HMOs) that might improve the efficiency of health care delivery are all possible byproducts of personnel shortages. The decision to intervene in the labor market is made through the political process and reflects society's willingness—or lack of willingness—to tolerate painful dislocations. In many industries such dislocations are viewed as normal and acceptable. Public policy actions have demonstrated that health care is viewed differently. The next three chapters of this report describe what educators, employers and regulators, together with government can do to facilitate smooth working of the market.

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CHAPTER 5

THE ROLE OF EDUCATION POLICY IN INFLUENCING SUPPLY

Without steps to bolster tomorrow's supply of personnel in several allied health fields, health care institutions will be hampered in meeting the public's demand for services. These steps will require coordinated actions by educators and employers, encouraged by modest but strategic federal, state, and private programs. Many of the recommendations in this and the following chapter are directed to educators, employers, and the allied health professions themselves. Although the committee believes its recommendations will be beneficial to those parties, it looks to public intervention to stimulate and amplify implementation.

This chapter is divided into three sections. The first deals with policies to influence the decisions of persons choosing careers. The second discusses the role of education institutions in maintaining or expanding enrollments. And the third addresses concerns about the preparedness of the future workforce.

The Allied Health Student Applicant Pool

For most fields the available trend data on allied health programs and graduations do not signal an imminent crisis requiring dramatic public intervention. But looking to the future, the committee is deeply concerned that the weak infrastructure of allied health education may compromise the system's ability to maintain enrollments, let alone increase supply where employment demand is high. A key to the viability of allied health education is its capacity to maintain its share of qualified students from the traditional college-age applicant pool while tapping into less traditional pools of students, particularly minority students.

For a number of years allied health deans and program directors have expressed concern about the declining number of applicants to their programs and the implications of this decline for the academic quality of the student body. Reportedly, spaces in many programs are going unfilled and this is jeopardizing the survival of academic programs. Comprehensive data collection concerning applicants to allied health programs is not done. However the Committee on Allied Health Education and Accreditation (CAHEA) annually surveys program directors in several allied health fields about whether applications to their programs are increasing, decreasing, or remaining stable. In its 1987 survey, program directors in 13 of 22 fields reported decreases in the number of applicants (CAHEA, 1987).

The clinical laboratory fields, in particular, were experiencing distress. For example, almost two-thirds of the medical technology program directors reported decreases in applicants in 1987. Of the 116 programs that voluntarily withdrew from CAHEA accreditation between 1983 and 1987, 36 attributed their decision to a declining applicant pool.

Unpublished survey data from the American Society of Allied Health Professions suggest that only physical therapy has a large applicant pool to draw upon, with about five applicants per academic space. Other fields such as dietetics, medical technology, radiologic technology, and medical record administration average only slightly more applicants than needed to fill their classes.

A recent survey of the College of Health Deans, an organization composed of allied health administrative units in 20 universities without medical centers from 17 states, revealed that only 3 out of 17 respondents reported that all their professional classes were filled. Although clinical laboratory programs were those most frequently cited as having excess capacity, many other fields also reported unfilled classes.

Although the current level of applications worries academic administrators, they are even more concerned about the future because of the predicted decline in the college age cohort of the population, a topic discussed in Chapter 3. This decrease suggests even greater competition for technically-oriented students than schools are now experiencing. Information on changing occupational preferences from annual surveys of college freshman shows a slow but steady decline between 1977 and 1985 in women's interest in careers in laboratory technology and dental hygiene (from 3.3 percent to 1.1 percent), dietetics and home economy (from 1.1 percent to 0.4 percent), and health technology (from 3.7 percent to 1.8 percent). Women's interest in the category termed "therapist" has remained relatively stable over the period; men have exhibited gradually increasing interest over the years (Cooperative Institutional Research Program, 1987).

Academic administrators are also concerned that with fewer applicants from which to select, the quality of students will decline. Thus far, except for the areas of clinical laboratory sciences and radiography, no decrease in student quality seems to be evident to program directors, as measured by the CAHEA survey. More objective evidence for assessing quality changes, such as grade point averages or test scores during students' first year of professional coursework, is not collected. The American College Testing Program (ACT) test scores of high school juniors intending to major in allied health fields do not bear out a shift in quality (see Table 5.1), although the downward trend in dental hygiene may deserve some attention.

TABLE 5.1: ACT Test Score Means for Students Specifying Academic Majors

Academic Major	ACT Composite Test Scores				Percent Change 1980-87
	1980-81	1983-84	1985-86	1986-87	
Dental Assisting	13.3	13.2	13.5	13.3	0
Dental Hygiene	16.1	15.5	15.4	15.0	-1.1
Medical Technology	18.2	18.2	18.6	18.2	0
Occupational Therapy	16.7	16.6	17.5	17.5	-0.8
Physical Therapy	17.8	18.0	18.8	18.5	1.0
Radiological Technology	14.4	15.4	15.9	15.8	1.4
Nursing (R.N.)	16.2	15.9	16.3	15.9	-0.3
Pharmacy	20.0	19.8	20.4	20.1	0.1
Overall College-Bound Population	18.5	18.2	18.3	18.7	1.1

SOURCE: American College Testing Program, unpublished data.

Not every allied health field has experienced an applicant deficit, as evidenced by the experience of physical therapy. Despite a rapid increase in the establishement of physical therapy programs, most directors report that they still have more than an adequate supply of applicants and can limit enrollment to those with high grade point averages. It is not unusual to find physical therapy programs with application to acceptance ratios of 10 to 1. In addition to physical therapy, a few of the newer professions such as perfusion and diagnostic medical sonography are also in great demand with about 60 percent of program directors experiencing application increases (CAHEA, 1987).

Because they are fewer in number and smaller in size it is difficult to equate the success of programs like perfusion, for example, with programs in physical therapy. Nonetheless, it is worth noting some of the characteristics of perfusion programs. Students are often drawn from other disciplines (respiratory therapy and critical care nursing, for example) and therefore have had some exposure to the new field. Employment opportunities abound and not all graduating students enter the clinical field, since other attractive opportunities are often available. For example, manufacturers and biomedical engineering laboratories hire some perfusionists; some enter medical school, and others choose teaching. Although perfusion is a high-stress profession, it is also a relatively well paid one. The average salary for a graduating student is $35,000, but highly qualified and experienced perfusionists may earn close to $100,000. While not known to the general public, perfusionists are respected in the allied health world for their success in garnering earnings and their relative independence (Brown, 1987).

Why do some programs fare better than others in attracting students? Some reasons come readily to mind. Undoubtedly the positive economic outlook for physical therapy--rising salaries, growing autonomy, and high demand for graduates--has affected student thinking. Also, in comparison with fields such as clinical laboratory technology, physical therapy has greater public visibility and more patient contact.

There may be lessons to be learned from schools of social work which have had success in increasing their applicant pool from 2 applicants per opening in 1983 to 3.5 applicants per opening today. Social work is considered to be closely related to (if not directly under the umbrella of) allied health. Deans of schools of social work attribute the revitalization of interest in social work careers to a wide variety of social and economic factors, including:

- optimism about the status of social welfare programs in the post-Reagan era
- a surge in the sense of social commitment among students (but not as dramatic as during the 1960s)
- occupational outlook projections of higher than average growth in demand
- the growth of independent practice and third-party payment
- some schools adopting "business-like" approaches to marketing and recruiting students
- salaries, while not high initially, that averaged about $27,800 in 1986-87 (Health Professions Report, 1988).

Visibility and comparatively high pay are elements that contribute to the attractiveness of a field, and in turn to schools' success in obtaining high application rates. Some fields that are viewed by the allied health community as being attractive and offering well-paying careers nonetheless do poorly in attracting students because they lack visibility. For example, occupational therapy shares many of the attributes of physical therapy, but its role in health care is not well known. Medical record administrators can earn over $50,000 per year and advance to hospital executive positions, but that field, too, is little known to the public.

Some allied health occupations, such as medical technology and radiography, do not offer particularly good economic rewards but seek to attract scientifically oriented students to work in potentially hazardous environments where they may be exposed to contaminated body fluids or radiation. Moreover, although laboratory and radiography employment prospects may be rebounding after PPS cutbacks, the atmosphere of job insecurity may still be influencing students' perceptions.

Student Recruitment

Many of the social factors that influence career choice are beyond the control of health care institutions or academics. The economic attractiveness of careers and work environment is largely in the hands of employers (a topic we will address in the next chapter) and those who make reimbursement decisions.

There are a number of techniques that schools have used to attract students. Among them are the use of professional recruiters, giving faculty release time to visit high school counselors and students, distribution of videotapes, and undertaking national promotions (such as Lab Week, fostered by the American Society for Medical Technology). Unfortunately, efforts to influence career choice toward an allied health field have not been systematically documented or evaluated.

Many psychological and social theories of career choice and career development have emerged over the years to explain how individual career development unfolds across the life span. These theories suggest the difficulties of intervening in a complex process. Career development is shaped by an interplay of psychological attributes, knowledge about training requirements, educational and occupational opportunities, genetic and childhood influences, evolving personalities, and patterns of traits that individuals express cognitively and psychologically in their choice behavior. Research related to career development finds that, like all human behavior, it is a highly complex process and is part of the total fabric of personality (Lent, 1986).

Most of the existing approaches to career development are based on limited samples of relatively privileged persons. The samples taken have typically been composed of men rather than of women, and the approaches to career development have, in general, been addressed to persons in the middle range of socioeconomic characteristics. Consequently, these approaches tend to emphasize the continuous and progressive aspects of career development that are possible primarily for persons who are relatively free to choose any career, and for whom both psychological and economic resources are available. Such criteria do not necessarily fit women and minorities (Crites and Fitzgerald, 1980).

The impact of several variables (including parental socio-economic status (SES), academic achievement, and sex) on both selection and persistence in career choice has been investigated in an attempt to determine who is being recruited into professions in general. These variables were used to analyze responses from the Department of Education's 1972 National Longitudinal Study (NLS) and recent follow-up surveys. Results showed that children of high SES parents are four times more likely than children of low SES parents to engage in professional study at the baccalaureate level and six times more likely to participate in or complete professional training at the graduate level. The SES level of parents does not have as much effect on the aspirations of children, however; children of high SES families are only twice as likely to wish for a professional career as their contemporaries from low SES families. Researchers conclude that the idea of substantial social and economic mobility in the United States has been exaggerated and is difficult to achieve. Only two percent of young people from low SES homes were in graduate-level professional programs seven years after high school, despite large federal student aid programs and numerous corporate and foundation programs to stimulate opportunities in the professions (Miller, 1986).

In general the career choice literature does not provide detailed guidance for recruitment efforts. But some implications for specific planning interventions can be drawn.

- The concept that people are only economic animals and that work is chosen only for the livelihood it offers is too simplistic. Work also provides a means for meeting needs of social interaction, dignity, self-esteem, self-identification, and other forms of psychological gratification.
- Personal, educational, occupational, or career maturation is comprised of complex learning processes that begin in early childhood and continue throughout life.
- Choice occurs not at a point in time but in relation to antecedent experiences and future alternatives.

- Career information must include not only objective factors such as earning possibilities, training requirements, and numbers of positions available but also the social and psychological aspects of careers as well.

- Career choice is frequently a compromise between the attractiveness of an alternative, the likelihood of attaining it, and the costs of attaining it (Herr and Cramer, 1984).

In summary, the literature on career choice is suggestive rather than prescriptive for recruitment tactics. Long-range efforts must take into account the need to make individuals aware of careers at an early stage. If women continue to predominate in many of the allied health fields, we must learn more about the dynamics of their career choice behavior.

Successful student recruitment efforts generally depend upon positive market signals emanating from the world of work. In the next chapter the committee will discuss actions that employers must take to improve the circumstances of allied health personnel in work settings where the perceptions of unsatisfactory careers accurately reflect reality. However, to the extent that potential students incorrectly believe that a career is unsatisfactory, the problem may require improved communication. Local consortia of professional association members, employer representatives, and educators should be formed to devise recruitment strategies based on community needs, charac- teristics and resources. These consortia should target nontraditional audiences, tailoring the message and method of communication to each. A marketing plan geared to attracting newly-unemployed workers from a local industry, for example, should not be the same as one that seeks to attract displaced homemakers or handicapped high school students.

Demand for technically oriented people is growing in many sectors of the economy. One study predicts that:

> The jobs that will be created between 1987 and 2000 will be substantially different from those in existence today. A number of jobs in the least-skilled job classes will disappear, while high-skilled professions will grow rapidly. Overall the skill mix of the economy will be moving rapidly upscale, with most new jobs demanding more education and higher levels of language, math and reasoning skills (Hudson Institute, 1987).

More specifically, over half of the new jobs created between 1984 and 2000 will need some high school education. Nearly a third will require a college degree; today, only 22 percent of occupations require a college degree (Hudson Institute, 1987). The health industry is not the only industry that is beginning to understand that one of the challenges of the future will be to position themselves favorably in the competition for the supply of educated, technically able workers. For some allied health fields there are already indications that potential practitioners are being lost to other fields. It is clear that educators, employers, and the professional associations must act if they want to maintain or increase their share of the workforce. The process of change is necessarily interactive. If employers succeed in making allied health employment more attractive, educational institutions will experience increases in the size and quality of the applicant pool. But, circularly, the extent to which employers are able to alter the conditions of employment depends in part on the education that workers have received.

The committee recommends that education institutions, in close collaboration with employers and professional associations, organize for recruitment of students. They should seek persons from less traditional applicant pools—minorities, older students, career changers, those already employed in health care, men (in fields where they are underrepresented), and individuals with handicapping conditions.

Minorities

Two major societal problems underlie concern about minority participation in allied health careers, leading the committee to devote special attention to this issue.

First, as several recent public policy documents have stated, minority populations in the United States have comparatively poor health status and use fewer resources relative to their needs. (U.S. Department of Health and Human Services, 1985). Although a causal relationship between the supply of minority practitioners and improved minority health care and health status is difficult to validate, minority health care workers are more likely to work in geographic areas and delivery sites that serve minority and other disadvantaged patients. Officials interviewed at three inner city hospitals, including two public hospitals, said that minorities are at least 50 percent of their total allied health workforce. Moreover, data extracted from facility records show that this pattern is relatively uniform across the different occupations such as clinical laboratory, physical and occupational therapy, dietetics, and medical records (Booker, 1987).

Second, there is a lack of parity throughout society between whites and non-whites in professional positions. To the extent that the allied health fields can provide improved career opportunities for minorities, a double benefit will occur. Education programs will be better able to maintain enrollments and personnel shortages may be alleviated in underserved geographic areas and institutions that serve poor minority populations.

To supplement a review of the literature on representation of minorities in allied health fields, the committee conducted extensive interviews with deans and faculty of ten schools active in the National Society for Allied Health—an organization committed to increasing the participation of black and other disadvantaged minorities in allied health practice, education, and administration. Other schools were added in an attempt to broaden the information base. A school known to have a predominantly Hispanic student body and structured activities to recruit Hispanics to allied health programs was selected; so was a school in an area with a large American Indian population. Finally, a non-minority school in the south was added because it boasts the largest number of allied health programs on a single campus and has been actively involved in minority allied health recruitment and retention efforts for some time (Booker, 1987).

Table 5.2 presents estimates of racial and ethnic characteristics of allied health personnel based on the results of an analysis of the 1980 Census. The data show that minority personnel are underrepresented relative to their representation in the U.S. labor force in the ten allied health fields the committee studied, particularly in the fields requiring higher education.

CAHEA reports that over the entire range of the fields it accredits the racial mix of students enrolled during 1986-87 generally mirrored the racial mix of the U.S. population. Blacks represented 11 percent of total enrollment, Hispanics 6 percent, and American Indians about 2 percent. What these data fail to reveal is that minorities are overrepresented in fields requiring less education, and underrepresented in fields requiring more education. It is not known the extent to which minorities have a higher departure rate from programs and careers. Several professional associations in fields requiring baccalaureate and advanced degrees have commented on the need for a greater effort to increase the number of minority students. For example, the 1984 Study Commission of the American Dietetics Association noted:

> While no effort has been made in the past to restrict other racial groups, or males, from the profession, little has been done to make the profession more attractive to them, nor has any strong effort been made to recruit them. The 1984 Study Commission believes such an effort is overdue.

Past Efforts To Increase Minority Participation

The Federal Government The federal government first initiated programs to encourage "culturally or economically disadvantaged individuals" to enter allied health as part of the 1970 health manpower legislation (P.L. 91-519). This statute was extended in 1973 by the Comprehensive Health Manpower Act (P.L. 92-157) and the Health Programs Extension Act (P.L.

TABLE 5.2: Distribution of Personnel in Selected Allied Health Fields by Race or Ethnic Origin, 1980.

	White (not of Spanish Origin)	Minority		
		Black	White (Spanish Origin)	Other Minority*
Laboratory Technicians	79.5	11.1	3.3	6.2
Dental Hygienists	95.4	1.6	1.6	1.3
Dietitians	84.6	6.7	1.9	8.0
Medical Record Technicians	84.4	9.5	2.2	3.9
Occupational Therapists	94.7	2.1	0.9	2.4
Physical Therapists	93.4	3.3	1.1	2.0
Radiologic Technicians	86.2	7.7	3.7	2.4
Respiratory Therapists	82.1	10.0	4.9	3.1
Speech and Hearing Therapists	92.9	4.3	1.5	1.3

SOURCE: Health Resources and Services Administration. An In-Depth Examination of the 1980 Decennial Census, Employment Data for Health Occupations, U.S. Department of Health and Human Services, 1984.

* Includes American Indians, Japanese, Chinese, and other Asians or Pacific Islanders.

93-45) and in 1976 by the Health Professions Educational Assistance Act (P.L. 94-484). An administrative decision was made to provide support for projects that emphasized the recruitment and retention of minorities and the disadvantaged (Carpenter, 1982).

Between fiscal years 1972 and 1977, approximately $20 million of a total of nearly $191 million of grants awarded for allied health was allocated for programs targeting minority and/or disadvantaged populations. In the period between 1978 and 1981, under P.L. 94-484, a larger share of the total, but smaller amount, was awarded for project activities to assist disadvantaged allied health students (Carpenter, 1982).

By fiscal year 1982, the only federal funding available of any magnitude for minority recruitment and retention in allied health training was the Health Careers Opportunity Program (HCOP). HCOP has five objectives: recruitment, preliminary education (non-credit), facilitation of entry, retention, and information dissemination. Examples of activities include career fairs; faculty counseling; tutoring; summer enrichment programs to enhance mathematics, science and communication skills; and linkage arrangements among undergraduate schools such as Historically Black Colleges and Universities (HBCUs), community colleges, and high schools.

Between fiscal years 1982 and 1987, the number of allied health grants under HCOP increased steadily, as did funds awarded. Of the $60 million or more awarded since fiscal year 1985, $5.37 million has gone to allied health programs. The proportion awarded each year to allied health programs rose from 5 percent to nearly 10 percent during this three-year period (Holland, 1987).

The Area Health Education Centers Program (AHEC) assists health professions schools in improving the distribution, supply, quality, utilization, and efficiency of health personnel in the health service delivery system by encouraging the regionalization of professional education. AHEC has no legislative mandate to recruit and retain minorities, but it has explicitly encouraged such activities. In fiscal year 1987, AHECs in Arizona, New Mexico, Texas, California, Oklahoma and at three black medical schools—Drew (Los Angeles), Meharry (Nashville), and Morehouse (Atlanta)—were cited by the AHEC officials as having active commitments to training professionals to serve Hispanic, Indian, and black populations. The AHEC financial investment in recruitment and retention of minority allied health students and workers is not obtainable from available program data (AHEC, 1987).

States Most state's health professions education programatic resources have been devoted to increasing the supply minority physicians and dentists, but a few states support initiatives for minorities in allied health training. For example, Connecticut funds a Health Sciences Cluster Program which exposes high school students to allied health professions; economically disadvantaged students in allied health in Georgia are eligible for a small grant program, the Regents Opportunity Grant Program (Mandex, 1987). The State of New York has developed an action plan to improve minority access to the licensed professions (including dental hygiene, speech-language pathology and audiology, physical therapy, and occupational therapy), the core of which is a comprehensive effort to improve curriculum development and teaching in mathematics and science in grades 7 through 12. In addition, the state offers financial assistance to allied health students willing to work in state agencies after graduation (New York State Education Department, 1985).

Allied health is rarely specifically identified in state legislation for targeted funding. Several investigators report being unable to ascertain the amount spent for allied health education because they are not distinguished from appropriations for "medical education". Of 13 allied health program officials interviewed, only one reported that their program received funds for minority recruitment and retention through a line item in the state budget.

Private Foundations Private organizations also see merit in encouraging minorities to select health care careers. The Josiah Macy Jr., and the Robert Wood Johnson foundations have been very active in these efforts. However, Robert Wood Johnson Foundation's staff report that current activities do not include allied health professions. Macy has sponsored some allied health professions training, but its primary focus, after more than 20 years' involvement in minority health professions education, is still physicians. The Macy experience is worth describing in some detail because its potential applicability to allied health education. (The following description is taken from Bleich, 1986, and Bleich, 1987.)

The basic concept of Macy's High School model is to use foundation funds to supplement tax levy support for participating schools. Strengthening curriculum and pre-medical advising early in a high school student's education are the centerpieces of this program. Linkages between colleges/universities and the high schools are common and serve as vehicles for faculty development, student exposure to careers, and academic enhancement.

For example, five high schools located in the three poorest counties in rural Alabama (50 percent of all families live below the federal poverty level) have completed a four-year cycle in the Macy Project. Macy reported the following results:

- 79 percent of the originally selected 114 students were retained in the honors program

- 100 percent of the honors students scheduled to graduate did so and are going to college; all but two anticipate attending a 4-year school

- 33 of the 88 graduates specified that they would pursue a health career; three cited physical therapy

- Macy graduates all took the mathematics placement exam given to all University of Alabama incoming freshmen; 88 percent placed into calculus or pre-calculus: 55 percent in calculus, 33 percent in pre-calculus. Macy notes that less than 10 percent of all Alabama freshmen do as well (Bleich, 1986).

The program in these schools, called Biomedical Sciences Preparation Program (BioPrep) and operating in grades 9 through 12, is conducted in conjunction with the University of Alabama School of Community and Allied Health, a school committed to increasing the number of health professionals practicing in rural Alabama. Many of the Macy graduates (57 of 88) were awarded tuition scholarships by the University.

Prior to BioPrep, school systems in the three counties (two of them predominantly black with a median of 8.5 completed school years) were unable to identify "gifted and talented" youth. Macy schools were able to attract more than 100 young people to its "rigorous academic program which has emphasized science, mathematics and language skills." Initial concerns about schools' ability to attract sufficient numbers of students for the program have proved to be unfounded; new classes are being enrolled in several schools and "in each setting there is growing interest and demand for a more rigorous curriculum" (Bleich, 1986; Bleich, 1987).

Extensive in-service training has taken place; curriculum development has been a collaborative activity between the high school teachers, BioPrep staff, and selected University faculty. Tutorials, enhanced science laboratories, and independent study have been offered at the schools; bi-monthly Saturday sessions and six-week summer programs have been held at the University of Alabama.

Macy reports that more than 1,200 students have enrolled in their projects. The foundation projects that more than 4,500 students will be enrolled in grades 9-12 when programs are fully established, and schools will graduate 700 college prepared minority students each year.

Other high schools in the project report results similar to the Alabama experience, lending credence to the potential of a model that blends public and private resources to effect systemic changes that can be institutionalized for long-lasting benefit.

Lessons That Have Been Learned

More than 20 years of experience in attempting to increase the number of minority allied health professionals suggest four areas that should be targeted for action:

- academic preparation, especially in the sciences and mathematics
- knowledge of allied health careers and promotion of minorities
- financing of institutions and students
- linkages and affiliations in training and employment.

Despite efforts of the federal government and individual institutions, barriers to allied health careers for minorities that were cited in the early 1970s remain serious problems. Can lessons gleaned from past efforts inform policy makers and educators about what kinds of investments need to be made in the future, where they will be most productive and which stakeholders can lead and contribute to greater success?

Academic Preparation Astin (1985) notes that minority underrepresentation in engineering, biological sciences, the physical sciences, and mathematics can be linked to low levels of academic preparation in mathematics and science prior to college enrollment. Academic preparation is also the central issue that affects the size and quality of the minority applicant pool for allied health training. Allied health deans and program directors firmly believe that streams of qualified minority applicants cannot be relied upon until academic deficiencies are substantially reduced (Interviews, 1987; The Circle Inc., 1987). HCOP grantees have typically focused on strengthening the skills of disadvantaged students in communications, mathematics, and the sciences. Six- to eight-week summer enrichment and tutorial programs are the usual interventions. Though there is partial evidence (La Jolla, 1984) that such interventions can work, the conventional wisdom is that the emphasis on mathematics and science should begin as early as possible, starting at or even before junior high school (Bisconti, 1980; Mingle, 1987; Flack, 1982; The Circle, Inc., 1987, National Commission of Allied Health Education, 1980; La Jolla, 1984). Perhaps allied health schools could gain more by helping to create alliances with others in the community to attack root causes of poor academic preparedness.

Allied health schools generally draw their students from known feeder sources. Strengthening academic preparation at the secondary school level and in other major feeder schools (e.g., community colleges) can contribute to lasting improvements in the quality of their applicant pools, influence curricular improvement at feeder schools, and bring greater visibility to allied health career opportunities. At the same time, early academic and career counseling, a compounding factor (Interviews, 1987; The Circle Inc., 1986; La Jolla, 1984), can be enhanced.

The Josiah Macy Jr. Foundation provides an excellent example of what can be accomplished if students are introduced to intense academic skills improvement programs early. Macy's success also provides an example of what can be accomplished by approaching problems from a broad perspective. The foundation incorporated a wide variety of resources and addressed areas other than the student's grade point average. They also concentrated on raising school administrators' and teachers' expectations of students, educating parents, acting as liaison for establishing collaborations between colleges and public secondary schools, and raising students' self esteem.

Knowledge and Promotion of Allied Health Professions Information plays a role both in attracting minority students to careers and in keeping them through training. Informing minorities about the wide range of allied health occupations and promoting these as career options is an important step in attracting them to these professions.

Educators believe that better information about the nature of the training and practice is a crucial factor in addressing the relatively high attrition of minority students in the first year of professional training. But information is not easily come by. Allied health professions are not widely mentioned in the media, nor are the contributions of allied health occupations to health care delivery explained (Baltimore Sun, 1987).

Those interviewed report that information dissemination through career days, distribution of brochures, and active recruitment is most effective when coupled with formal and informal linkages with feeder high schools and colleges. One school which recently began recruiting through churches reports this as a rich and largely untapped source of minority allied health applicants.

Research data and experiences of recruiters suggest that the following factors should be taken into account in shaping effective information dissemination and promoting campaigns; The Circle, Inc., 1987; Mingle, 1987):

- Minority allied health students are more likely to be older and to have children than are liberal arts students.
- Students demonstrating potential in high school or community colleges may yield more growth in the applicant pool than if recruiters focus primarily on high achievers who are also heavily advised and recruited for medicine, engineering and other professions.
- Community colleges can become a good source from which to draw students interested in earning a bachelor degree, especially if linkage arrangements that incorporate approaches to sharpening critical skills and increasing students' awareness of career options are implemented.
- Persons disenchanted with their current occupations in other fields may be seeking an opportunity to pursue a challenging and rewarding career (The Circle, Inc., 1987).

Financing of Institutions and Students Deficiencies in academic preparation are fairly widespread among minority allied health students, and deans of allied health schools expect this shortcoming to continue in the near term. They believe that financial support will continue to be needed for activities that help struggling students remain in school. These activities include pre-matriculation summer programs, faculty and peer tutoring and counselling, computer-aided learning assistance or instruction, and curriculum improvement/faculty development with feeder schools.

Deans of allied health schools concluded that external support such as HCOP is essential to underwrite some of these institutional expenses (The Circle, 1987). In general, intensive minority recruitment and retention activities are supported, at least in part and frequently at a substantial level, by external funds. HCOP has been predominant here (for all activities except curriculum improvements in allied health training programs). A 1984 assessment of preparatory activities supported by HCOP (i.e., preliminary education, entry facilitation, and retention) concluded that:

> Since by far the largest expenditures for HCOP are for preparatory activities, it is essential that HRSA [Health Resources and Services Administration] and the grantees focus special attention on providing those preparatory activity services that produce the greatest benefit to the objectives of the HCOP program (La Jolla, 1984).

Since 1978, funding for allied health under HCOP has increased as a proportion of the total HCOP investment, but total funds for the program as a whole have fallen and authorized purposes have been more narrowly defined. For example, there are currently no federal programs that support development of minority allied health faculty or curriculum improvements in minority schools or in non-minority schools that see curriculum changes as one way to recruit and retain more minorities.

Programs such as the Minority Access to Research Careers (MARC) and Minority Biomedical Research Support (MBRS), the oldest and preeminent among existing minority-oriented programs administered by the National Institutes of Health (NIH), support these kinds of activities. These programs have been credited with contributing substantially to increasing research, research training, and the number of researchers in institutions that train large numbers of minorities. Included in this cluster are significant numbers of traditionally and predominantly minority schools (Garrison and Brown, 1985; Gonzales, 1987).

Along with institutional support, insufficient student financial aid is seen as a deterrent both to minority student recruitment and retention. Deans cited money as a major reason for student attrition. Many minority allied health students are older and have children. Many of these students find that schedules generally do not permit them to continue working. In such circumstances financial aid is a crucial factor in their persistence toward a degree. Bisconti (1981) notes that "a degree in an allied health major frequently is more expensive than a liberal arts degree." Tuition costs may not be higher, but there may be add-on costs for clinical education, materials or equipment, and the period of training (both pre-professional and professional) may be longer. Although states are investing in the education support of minority health professionals, the size of these investments varies widely and most state aid is targeted to medicine and dentistry. The committees' interview respondents feel that states need to provide more student financial aid. Models that have successfully contributed to shifting the distribution of medical and dental professionals (e.g., National Health Service Corps, loan forgiveness, AHEC), by offering incentives for minority professionals to work in underserved areas are strategies that may be applied effectively to allied health practitioners.

Linkages and Affiliations in Training and Employment Linkages among colleges and high schools are playing an increasingly important role in encouraging the training of minority allied health professionals. Directors of allied health programs with and without HCOP grants acknowledge their value in recruiting students. Linkages with high schools for recruitment purposes appear to be becoming more formalized, perhaps in response to the continued emphasis on linkages to high schools by HCOP since 1981. Data show more linkages exist with high schools and to four-year historically black colleges and universities than with community colleges. However, some schools that today lack community college linkages report plans to explore these arrangements. Linkages appear to work well when there is shared commitment and mutual benefit regardless of whether the arrangement is formal (as in a written agreement that specifies responsibilities and benefits) or informal (a working relationship).

The predominatly minority schools we contacted report no difficulty in finding adequate clinical placements for their students. These placements are most often in areas with large minority populations. Programs are today very dependent on hospitals and have limited experience with other kinds of sites for students' clinical training, thus clinical training may be threatened if hospital revenues are reduced. However, several schools reported that clinical sites pay the tuition for students they accept for clinical placements, usually because the hospital is interested in hiring students who train with them. This interest should help sustain affiliation agreements between schools and hospitals, especially if workers are scarce.

No strategy for significant increases in minority participation in allied health professions will be successful unless it targets resources at the major barriers to minority participation, and involves the complete spectrum of interested parties, both in government and the private sector. Minority recruitment efforts must begin before high school. Academic institutions must offer support services for retention and seek to promote educational mobility. To succeed in the long term these efforts must be made integral to the mission of the educational institutions.

Ultimately, success will depend upon education institutions making a long-term commitment to integrating minority recruitment and retention into the fabric of their allied health programs. Erosion of federal support for this objective would undermine those in the education community who are struggling to gain or maintain such a commitment to minority allied health education. The committee endorses the objectives of the Health Careers Opportunity Program and believes that funding levels must at least be maintained at current levels.

Maintaining and Expanding Education Capacity

The future supply of new graduates depends not only on students careers in allied health, but also on the maintenance and expansion of education opportunities.

Hospital sponsored allied health education programs suffered more closures than other types of programs. Three hundred fifteen hospital sponsored programs closed between 1982 and 1986, compared with a small number of proprietary school closures. By contrast, a net increase in programs was experienced by community colleges (100 or 9.6 percent) and junior colleges; (26 or 4 percent) (CAHEA, 1987c). Table 5.3 shows the net change in some CAHEA-accredited allied health programs between 1982 and 1986. Much of the decline in allied health education capacity can be attributed to the closing of hospital-based training programs—principally laboratory and radiologic technology. Programs with the largest number of withdrawals from CAHEA accreditation (and presumed by CAHEA to have closed) are medical technology (116), radiography (103) and respiratory therapy technology at the certificate level (29) (CAHEA, 1987b).

Among programs not accredited by CAHEA, physical therapy grew rapidly—from 84 baccalaureate programs in academic year 1980-81 to 97 in 1985-86, and from 9 master degree programs to 14 during that same period (APTA, 1987).

There is no clear evidence that capacity in higher education institutions is in serious jeopardy. However, program closings coupled with fears of a decline in the number of applicants have heightened allied health program directors' feeling of vulnerability. This feeling of vulnerability, expressed by educators to the committee during its deliberations, is due to the concern that:

TABLE 5.3: Changes in the Number of CAHEA Accredited Programs Between 1982 and 1986

CAHEA-Accredited Programs	Number of Programs in 1982	Number of Programs in 1986	Percent Change
Negative Change			
Medical Laboratory Technician (Certificate)	73	47	-35.6
Medical Technologist	639	516	-19.2
Radiographer	790	701	-11.3
Respiratory Therapy Technician	188	169	-10.1
Nuclear Medicine Technologist	138	128	-7.2
Medical Record Administrator	57	53	-7.0
Positive Change			
Medical Record Technician	85	87	2.4
Occupational Therapist	56	63	12.5
Medical Lab Technician (Associate Degree)	187	214	14.4
Respiratory Therapist	204	235	15.2

SOURCE: Committe on Allied Heath Education and Accreditation, Allied Health Education Directory, 15th Edition. Chicago: American Medical Association, 1987.

- allied health education will not be able to maintain its foothold in research universities
- clincial education sites will grow scarce
- financially stressed education institutions of all types, viewing allied health as a costly endeavor, will close allied health programs.

Given the nation's projected need for allied health personnel and their relatively short stay in the allied health workforce (see Chapter 4), serious erosion of the education sector's capacity to supply the nation with allied health personnel must be avoided. The question for public policy action is whether vulnerability poses a real and present danger that cannot be addressed by market forces alone. If government intervention and/or private efforts are required, what actions will offer the greatest return on public and private investments? To answer this question, we must first understand the role of various important decision-makers and how their actions can strengthen or weaken allied health education programs.

Who Influences Educational Capacity Decisions?

The decision to open or close allied health programs or to expand or contract enrollments is ostensibly in the hands of education institutions themselves. Typically, a dialogue occurs between a dean or department head and the chief administrator for academic affairs about the desirability of adding programs or the need to close or reduce a program. The remarks of a university president, who earlier in his career was responsible for manpower projections at one of the allied health professions associations, provide some interesting insights into the context of this dialogue:

> It obviously becomes extremely difficult for a university president to justify the continuation of this or any other program when student demand has moved elsewhere, say to real estate, and when the dean of the school of business is clamoring for those scarce resources to be diverted to their front. Further, since the average age of my faculty is only 49, natural attrition does not facilitate resource shifts.
>
> It would be easier for me to justify maintenance of high cost programs if external support were still flowing to my campus, however, as you are well aware, there has been a steady decline in the amount of federal dollars available for health education. Therefore, academic administrators are on the horns of a dilemma and now, like health care administrators, we must monitor the environment continuously and respond to changes as never before. Strategic planning is the name of the game. Universities can no longer afford to be all things to all people (Perrin, 1987).

Decision making does not take place in isolation. Many parties can be involved in precipitating the dialogue and influencing the course of decision making. This includes federal agencies such as the Bureau of Health Professions (BHPr), state higher education and licensing agencies, state political leaders, accrediting bodies, professional associations, and local health care providers. At times the pressures exerted by these parties, and conversely the opportunities they have offered schools through grant-giving, for example, so overwhelm institutional autonomy that it is difficult to discern where control lies.

The issue of control is an important one because by understanding the distribution of authority over allied health education one can identify how the forces that shape decisions about education capacity can be influenced to accomplish public policy goals. These goals encompass not only the size of enrollments, but the quality of education, its content, and the ability of the education system to add to the workforce.

The Federal Role A major direct influence on the development of allied health manpower training capacity has been the federal Bureau of Health Professions and its predecessor organizations.

In 1966, not long after Congress enacted federal education funding for medicine, osteopathy, dentistry, veterinary medicine, optometry, podiatry, and pharmacy in one law, and nursing under another authority, it also provided education funding for 13 allied health fields. The Allied Health Professions Personnel Training Act offered five types of grants:

- construction grants for training centers and affiliated hospitals
- basic improvement grants awarded on a formula of $5,000 times the number of eligible curricula in the center plus $500 times the number of full-time students receiving training
- grants to support traineeships for allied health personnel to become teachers, administrators, supervisors or to serve in allied health specialities
- "new methods" grants to allied health training centers for projects to develop, demonstrate, or evaluate curricula for the training of new types of health technologists (U.S. Department of Health, Education, and Welfare, 1987).

Table 5.4 depicts the funding history of this law and its successor pieces of legislation. Although no federal programs have specifically supported allied health training since 1981, allied health students and schools are eligible for funds under several general health professions education authorities, including:

- the federally-insured HEAL Student Loan Program
- educational assistance to disadvantaged students
- health professions special initiatives (grants for special projects in areas such as health promotion and disease prevention; curricula development in health policy, clinical nutrition, and the application of social and behavioral services to the study of health care delivery; the development of mechanisms for assuring the competence of health professions; the development of instruction, including clinical affiliations, in geriatrics).

Efforts to assess the impact of federal funding have been stymied by lack of data. As a major federal report on allied health concluded:

> It appears that it [federal funding] added impetus to a trend that was already underway . . . much of the private sector growth in educational programs that occurred between 1966 and 1971 without allied health grant support may have occurred in expectation of federal assistance. Quite apart from the question of the relative importance of federal support in increasing allied health manpower output is the problem of determining what the increase was and where it occurred. Prior to establishment of a federal role in allied health manpower, there was insufficient interest in the problems to allow the collection of data on educational programs. Not until 1972 was reliable information obtained on the type and amount of training offered by colleges and universities. Some collegiate program growth occurred at the expense of hospital-based programs and on-the-job training, another factor for which there are no reliable data (U.S. Department of Health, and Welfare, 1979).

Other segments of the federal government have also played a role. The Health Care Financing Administration, through the Medicare program, has provided support for clinically-based education. The Department of Education has helped through its role in general support of higher education loans and scholarships and in its specific role of vocational-technical training. The Veterans Administration and the military services have also played a part in training the civilian supply as they train for their own personnel needs. Finally, the Department of

Labor has been concerned with entry-level occupations having offered training through the Comprehensive Employment Training Act (CETA) program and later Job Partnership and Training Act (JPTA).

TABLE 5.4: Division of Associated and Dental Health Professions[1] Grants, Cooperative Agreements and Contracts Awarded in the Area of Allied Health, Fiscal Years 1967 through 1986

Fiscal Year	Advanced Traineeship	Training Institutes	Special Improvement	Special Projects	Basic Improvements	Other	Totals
1967	$ 241,977	$ 0	$ 0	$ 0	$ 3,285,000	$ 0	$ 3,526,977
1968	1,203,648	0	0	799,507	9,750,000	0	11,753,155
1979	1,549,772	0	0	1,225,000	9,750,000	0	12,524,772
1970	1,538,064	0	0	1,231,938	9,701,000	0	12,471,002
1971	2,460,851	482,838	0	4,482,617	9,701,000	0	17,127,306
1972	2,585,936	324,064	10,500,000	7,628,384	0	0	21,038,384
1973	1,951,598	1,139,555	7,000,000	5,639,408	0	0	15,730,561
1973[2]	0	0	10,500,000	0	0	0	15,999,947
1974	2,563,000	999,888	16,000,000	10,126,537	0	0	29,689,425
1975	2,606,713	956,267	10,192,034	6,869,220	0	0	20,624,234
1976	2,563,000	1,000,000	10,499,999	8,197,432	0	0	22,260,431
1977	2,331,580	638,312	8,910,000	8,406,537	0	0	20,286,429
1978	1,443,562	924,070	0	14,345,813	0	0	16,713,445
1979	1,493,949	1,004,907	0	8,151,264	0	0	10,650,120
1980	887,062	0	0	4,251,671	0	738,961[3]	5,877,694
1981	0	0	0	508,143	0	364,516[3]	872,659
1982	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0
1984	0	0	0	0	0	908,550[4]	908,550
1985	0	0	0	0	0	883,525[4]	883,525
1986	0	0	0	0	0	0	0
TOTAL	$25,420,712	$7,469,901	$73,602,033	$87,363,418	$42,187,000	$38,101,018	$274,144,082[5]

SOURCE:

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[1] Prior to 1983, the Division was known as Division of Associated Health Professions.

[2] Released impounded funds.

[3] MEDIHC cooperative agreement funds.

[4] Grant for allied health personnel in health promotion and disease prevention.

[5] Grand total includes contract award amounts. Contract amounts awarded by fiscal year are not available at this time.

The State Role Through their involvement in higher education financing and regulation, states are a major force in determining the number and distribution of allied health programs. In 1976 (the last year of complete data), 71 percent of public collegiate institutions had at least one allied health program, but only 36 percent of private schools offered allied health education (National Committee on Allied Health Education, 1980).

The propensity to invest in allied health education depends in part on the health of the state's economy. In one of its workshops the committee explored decision making in three states—Texas, Illinois, and New York. Participants included representatives of higher education coordinating authorities, general collegiate administrators, and allied health school deans from different types of institutions. They described decision making and a sense of vulnerability that was related to the economic health of their regions.

Allied health program administrators in Texas, where tax revenues have been falling due to the declining oil industry, felt at greatest risk. The Texas allied health educators believed themselves to be the first line of defense against medical school cutbacks.

The economic situation was somewhat better in Illinois, but overall state higher education cutbacks were forcing state college systems to plan how to respond to budget cuts if a pending tax increase did not occur. One school system, having already raised tuition the previous year, had directed its deans to consider the implications of a 5 percent budget reduction. The options available to one allied health dean included: (a) not filling vacant faculty positions, (b) offering some courses once instead of twice that year, (c) canceling planned equipment purchases, and (d) closing the school's physical therapy program, which needed more space.

At the time of the workshop, New York State deans and policy officials were not focused on budget cuts forced by the states' economic picture, but on the state's responsibility for ensuring an adequate supply of health care personnel. A state health department task force had recently been formed to explore "critical shortages" in nursing, home health care, and physical therapy services. One issue prompting task force creation was the inability of state chronic care facilities to recruit therapists. Deans attending the committee's workshop identified faculty shortage as a major impediment to expanding education programs and enrollments in physical therapy and occupational therapy.

State-wide planning frequently occurs under the auspices of state higher education coordinating bodies which have responsibility for approving new education programs. In evaluating new programs, the coordinating bodies consider such issues as geographic maldistribution of programs and practitioners and the impact of new programs on minority participation. Decision makers who participate in this policy arena often must be reconciled to the fact that the politics of higher education planning (deciding, for example, which among competing institutions should receive the new program) may not lead to the conclusions that make the most sense from a health planning standpoint.

States emphasize different values in their review of criteria for new programs. Missouri notes that its

> State-wide review is principally interested in the state's need for programs and services, and resource allocation issues. That is, the statewide need for particular programs and the appropriate means of financing these needs to assure Missouri's citizens financial access to quality educational experience (Missouri Coordinating Board, 1986).

In contrast, Texas has stated that

> The expenditure of public tax funds for educational programs in any occupational area is a matter of public policy directed at meeting a public need that cannot or will not be met otherwise. Student interest is not the major concern for expenditure of public tax funds for an occupational training program (Allied Health Education Advisory Committee, 1980).

The ability of state coordinating bodies to enforce their resource allocation policies varies. Some state authorities may only be able to apply jawboning tactics to influence institutional decisions. In some cases battles are fought in the state legislature's higher education budgeting process—a specific line-item request for a new program, for example. Depending on state political tradition, legislators may choose to wield influence in favor of constituent education institutions and in response to lobbying efforts. Most often, however, the survival of allied health programs is brought into question when academic institutions find themselves forced to reallocate institutional resources as a result of a budget crisis. In some states, higher education coordinating governing bodies have statutory review powers for new programs.

The Private Sector Role The private sector role can be seen in the activities of accrediting bodies, professional associations, and foundations.

Accrediting Bodies There are a multiplicity of issues surrounding who should control accreditation, how it should be structured, and whether it could be a less costly process. This discussion, however, will focus on accreditation standards, which have a major impact on collegiate decision making about new or expanded programs.

Program administrators must take into account the cost of complying with the standards of accrediting bodies and the recommendations of site review teams. For example, programs sometimes close because they cannot maintain student-faculty ratios, equipment, or space required by the accrediting body. Often there is a clash between the accrediting body (which believes its essentials assure basic minimum standards) and generalist academic administrators (who see site review recommendations as a tool to be used by departmental chairmen to get more support for their programs).

Professional Associations Historically, much of the education activity of allied health professional associations has been in promoting the shift of educational programs from hospitals to academic institutions. Once accomplished, interest often centered on raising the entry-level of the profession and/or creating assistant-level categories. Today, associations' education activities range more widely. They might include consultation to academic institutions contemplating new program offerings, workshops for administrators and faculty, student recruitment programs, and the maintenance of education databases. It should be noted, however, that not all allied health fields have well-organized professional associations who can engage in education activities. Supplementing the work of professional associations are the American Society of Allied Health Professions and the National Society of Allied Health—two organizations that cut across disciplinary lines in an effort to help their members address education issues common to most fields. Accreditation responsibilities for dietetics, physical therapy, and speech-language and hearing are handled through independent entities operating in conjunction with the professional associations.

Because of an extensive literature, and activities of the Federal Trade Commission with regard to the role of the American Medical Association in matters of physician supply, it is reasonable to raise the question of whether allied health associations influence supply, restricting entry as a means of enhancing the economic status of its members. An investigation to determine such influence, however, was beyond the scope of this study.

Private Foundations Complementary to the role of federal and state support is the contribution of philanthropy in generating experiments in allied health education. Principal among the foundations is the W. K. Kellogg Foundation, which over many years served as a spur to institutional development and leadership activities, and to studies of allied health fields. Currently the foundation is supporting a clearing house at the University of Alabama to clarify and promote the concept of multicompetency in allied health and support several activities of the American Society of Allied Health Professions.

Why is Allied Health Education Vulnerable?

As the previous section's review of federal, state and private roles indicates, the era of direct efforts to expand the allied health education enterprise has ended. Yet, the day-to-day business of federal, state, and private decision makers continues to shape allied health education.

Federal Medicare reimbursement policy, state higher education budgeting and regulation, interest groups pursuing enhanced professional status, and educational accreditation are all powerful influences on allied health education's future. How stable education institutions will be in the future will depend on their ability to compete for higher education resources with other more entrenched academic programs whose graduates may also be in high demand.

Maintaining Ground in Academia A number of prestigious institutions—University of Pennsylvania, University of Michigan, Emory University, and Stanford University, for example—have closed allied health schools and programs. A fundamental component of the rationale for closure appears to have been that the preparation of allied health practitioners did not sufficiently contribute to the aspirations of a research university seeking to concentrate its resources in areas of strength. As allied health deans see some of the most noteworthy programs close, they grow apprehensive about the future of their own programs. They are also concerned about the future of allied health programs because the programs lack the capacity to foster research and produce teachers and academic leaders (Hedrick, 1985; Broski, 1985).

Although it is difficult to document the fragile condition of allied health education, the committee believes there is some basis for the deans' apprehension. Furthermore, the committee is concerned that closures have signaled to academic decision makers and public officials alike that allied health education may not be a sound investment for scarce educational dollars.

As Table 5.5 (based on 1970s data from the National Commission on Allied Health Education) demonstrates, these programs long existed in almost every type of collegiate institution. The committee believes that there is no generic or inherent quality that disqualifies allied health education from life on any campus in the nation. The diversity and evolution of the many occupations suggests that some are more suited than others to various academic settings and degree levels. But conclusions drawn today about a given field may change tomorrow as knowledge and practice evolve. Each type of collegiate setting has its advantages and disadvantages. Generally speaking, for example, academic health science centers have easier access to clinical resources and a wide range of opportunities for interdisciplinary experiences. However, as reported to the committee, the latitude for decision making and creativity of program design by deans and program directors has traditionally been more limited in academic health science centers than in schools of allied health that are independent of such centers. Community colleges shine in their ability to market to diverse student populations who are job-oriented. Education there is tailored to suit the needs of employers and students in a given local community.

TABLE 5.5: Percent of Collegiate Institutions with Allied Health Programs in 1975-76, by Carnegie Classification of Institutional Type

Type of Institution	Total Number of Such Institutions in the U.S	Number and Percent with Allied Health Programs		Percent of Allied Health Programs in Such Institutions
		Number	Percent	
Research Universitites I Leading universities in terms of federal financial support for academic science and award at least 50 Ph.D.s annually (and M.D.s if medical school on the same campus).	51	47	92	7.95
Research Universities II Among the leading 100 institutions in terms of federal financial support and award at least 50 Ph.D.s (and M.D.s if applicable).	47	41	87	5.36
Doctoral-Granting Universities I Award 40 or more Ph.D.s (and M.D.s) or received at least $3 million in total federal support in either 1969-70 or 1970-71. No institutions are included that grant fewer than 50 Ph.D.s (or (M.D.s).	56	47	84	6.11
Doctoral-Granting Universities II Institutions awarding at least 10 Ph.D.s	30	27	90	2.72
Comprehensive Universities and Colleges I Institutions offering a liberal arts program and several others (e.g., engineering, business administration); that have at least two professional or occupational programs, and enroll at least 2,000 students. Many have master's programs and, at most, limited doctoral programs.	380	302	79	22.76
Comprehensive Universities and Colleges II State colleges and some private colleges that offer a liberal arts program and at least one professional or occupational program such as nursing or teacher training, mainly with a degree in education.	217	135	63	5.25
Liberal Arts Colleges I Highly selective or among the 200 leading baccalaureate-granting institutions in terms of numbers of graduates receiving Ph.D.s at 40 leading doctoral-granting institutions.	126	27	21	0.75
Liberal Arts Colleges II Other liberal arts colleges, many of which are extensively involved in teacher training, granting degrees in arts and sciences rather than in education.	474	243	51	8.33

continues. . .

Table 5.5 (Continued)

Type of Institution	Total Number of Such Institutions in the U.S	Number and Percent with Allied Health Programs		Percent of Allied Health Programs in Such Institutions
		Number	Percent	
Two-Year Colleges and Institutions	1,135	671	59	35.18
Theological Seminaries, Bible Colleges, and Other Institutions Offering Degrees in Religion	277	5	2	0.07
Medical Schools and Medical Centers Includes only those that are listed as separate campuses in USOE Opening Fall Enrollment.	51	35	69	3.95
Other Separate Health Professional Schools	29	7	24	0.17
Schools of Engineering and Technology Technical institutions are included only if they award a bachelor's degree and if their program is limited exclusively or almost exclusively to technical fields of study.	47	10	21	0.5
Schools of Business Management Included only if they award a bachelor's or higher degree and if their program is limited exclusively or almost exclusively to a business curriculum.	35	13	37	0.3
Schools of Art, Music, Design	58	2	3	0.05
Schools of Law	16	2	--	0.05
Teachers Colleges	28	5	18	0.32
Other Specialized Institutions Includes graduate centers, maritime academies, military institutions (lacking a liberal arts program), and miscellaneous.	35	3	9	0.17

SOURCE: The Future of Allied Health Education: New Alliances for the 1980s. National Commission on Allied Health Education. 1980.

To guide institutions deciding whether to continue or start allied health education programs the Southern Regional Education Board suggested that the following questions be considered:

Mission: Is the program consistent with the institution's philosophy and purpose?

Employment: Will graduates be able to secure employment and will that employment satisfy the local, state, regional, and/or national mission of the institution?

Accreditation: Is the institution willing to invest in a program, given the resource consumption implicit in achieving accreditation?

Students: Will there be sufficient enrollment over a sustained period of time?

Budgetary concerns: Is the institution prepared to adopt programs in which clinical components may require equipment, supervision, and costs that often exceed those of other types of academic programs?

Faculty: Is there a sufficient faculty pool to draw from and what resources will be necessary to attract qualified individuals to teach? (Malone, 1980)

Today, allied health education appears vulnerable on all but the "employment demand" criterion. The key to improving allied health's bargaining position in academia is to demonstrate value to the parent institution striving to fulfill its mission of scholarship or community service. The recommendations that follow are designed to address some problems that prevent allied health programs effectively competing for institutional resources, thus endangering their viability.

Faculty Shortages Because many allied health fields are relatively new to collegiate environments and have grown rapidly in the past two decades, educational programs often face both quantitative and qualitative problems in filling faculty positions. In physical therapy, for example, the number of accredited university programs grew from 48 in 1970 to 113 in 1986. The supply of faculty appears not to have kept pace. A 1985 survey of academic administrators in these programs reported a need for 152 additional faculty simply to meet current demands (APTA, 1985). As a result, many programs rely heavily on part-time lecturers without regular faculty appointments, on faculty from scientific disciplines who do not hold professional qualifications in the clinical field, and on professionals who lack the academic credentials traditionally expected of university faculty. For example, in its faculty survey, APTA reported that only 28.2 percent of full-time faculty in physical therapy programs held a doctoral degree. This is in clear contrast with national data that show 54.9 percent of all faculty teaching in institutions of higher education hold the doctorate (Carnegie Foundation for the Advancement of Teaching, 1985). Recruitment of qualified new faculty is seriously hampered by the very limited pool of candidates. Even relatively mature occupations such as occupational and physical therapy report that only about one percent of all members hold a doctorate degree, and just over 24 percent have master's degrees (APTA, 1987; AOTA, 1987).

In a survey of 124 medical record education programs (over 80 percent of all programs), the majority employed only one or two additional faculty members beside the program director; no program had more than four full-time additional faculty. Only five directors in these schools had a doctorate. Among the 53 full-time faculty members in university-based programs, only 2 possessed doctorates, 33 had master degrees, and 18 had baccalaureates as their highest academic degree (Amatayakul, 1987).

Although some allied health professionals are enrolled in master and doctoral degree programs, lack of financial aid and the relatively low earnings of allied health clinicians force most to do this advanced study on a part-time basis over a long period. Lack of funding has also constrained the development of graduate programs in some allied health disciplines. Although advanced study in related disciplines such as physiology, psychology, or education benefits allied health faculty, the lack of graduate programs in their own disciplines has limited the number of allied health faculty who are active scholars in the field in which they have the greatest teaching responsibility.

Options for producing faculty efficiently should be explored in order to maximize faculty development resources. The American Occupational Therapy Association has had some success with targeting faculty development efforts to clinical faculty who might be inclined to pursue full-time teaching appointments (Presseller, 1987). Another approach would be to focus attention on streamlined allied health certificate programs that give individuals with Ph.D.s in other academic disciplines the opportunity to gain a practice credential for teaching purposes. Holcomb (1987) describes a partnership between Baylor College of Medicine, Texas A&M University, and the University of Houston that offers programs in allied health teacher education and administration which have been productive in supplying faculty nationwide.

The rationale for a federal role in faculty development in allied health is similar to the justification for federal support of family practice programs in medicine. From 1972 through 1984, federal grants of over $200 million fostered the growth of graduate family medicine training activities (Health Resources and Services Administration, 1986)

Like allied health, family medicine exists because the federal government was willing to promote a concept designed to address some of the health care system's deficiencies. As a new endeavor, family medicine departments lack qualified faculty and the ability to garner research funds from traditional sources such as the National Institutes of Health (NIH) partly because of non-competitive research credentials among faculty, and partly because of the low funding priority of primary care research. Like allied health, family medicine has yet to prove itself to the establishment at academic medical centers—a task that is inhibited by a reimbursement system that does not generally reward non-procedure-oriented faculty practice. Federal grants are used to make the playing field more level for family medicine in the competitive medical school environment.

Federal investment in family practice is based on the policy assessment that primary care needs are unmet and that these programs are a cost-efficient means of producing and distributing primary care practitioners. Similar national goals regarding rehabilitation, disease prevention, AIDS treatment, and geriatrics can be well-served by support of allied health education.

The committee recommends that the federal government and states fund faculty development grants in allied health fields, especially where faculty availability and lack of clinical expertise inhibit the production of entry-level practitioners.

In its final report, the NIH task force concluded that the extramural and intermural program activities then supported by the NIH were consistent with the NIH's mission and that studies conducted with nurses as principle investigators and studies designed to improve nursing care (but not necessarily directed by nurses) could be fostered through a combination of activities. These activities were intended to assist in training nurse researchers, to encourage greater collaboration and interest of medical scientists in interdisciplinary work, and to enhance the capability of nurses in competing for research support (National Institutes of Health, 1984).

Although data are hard to come by, the status of the research capability of most allied health fields appears to be less developed than in nursing. In part this may be due to the fact that nursing has had a continuing commitment to research from the federal Nurse Training Act. Covey and Burke (1987), writing in the Journal of Allied Health, offer an additional explanation:

> Because qualified faculty by the traditional standards were not available, selection of our University faculty has often been largely from the practitioner ranks and from those who had perhaps acquired graduate degrees in such unrelated disciplines as education or administration. The

> focus of their training has been on technological competence and, in some cases, discipline pedagogy but has not always included research. By virtue of their own training, deans and directors themselves are often unable to develop the junior faculty and, in fact, too many deans and program directors either lack an understanding of or simply ignore the tripartite academic mission.

In later chapters of this report dealing with issues of health care management, regulation, and long-term care, the committee notes decisions that administrators, payers, and regulators must make in the absence of a research literature in allied health. Medical scientists and other researchers on their own will not, and can not, define research priorites among health services delivery issues or the clinical applications that typically concern allied health practitioners. Although medical scientists should be encouraged to develop collegial relationships and undertake joint projects with allied health personnel, they are not likely to be as interested in the outcome measurement and cost-effectiveness issues that need to be addressed as are those who deliver the services.

Allied health fields vary in their maturity with respect to a productive research capacity. Some fields, such as dental hygiene in which most practitioners have less than a baccalaureate, are only now beginning to explore the possibilities of a cadre of research leaders to build a body of knowledge linked to a theoretical framework. This research should go beyond simple unrelated pilot studies. It should define dental hygiene as distinct from dentistry, and explore the efficiency of methods and modes of practice (Bowen, 1988). In contrast, other fields like speech-language pathology and audiology have many practitioners with master degrees and doctorates and a rich history of tapping into a growing knowledge base in human communication services and disorders. Both fields, however, share a concern over the lack of relevant research that finds its way to those providing patient services whether it be to the communicatively impaired (Ludlow, 1986) or to those seeking preventive services from a dental hygienist.

A cadre of researchers and academic leaders is needed to advance the scientific base of allied health practice. To accomplish this, institutions with strong research commitments should consider developing programs that identify and nurture talented individuals. The committee recommends that a federal research fellowship program be developed to support these activities.

Financing Clinical Education The closing of hospital education programs discussed earlier in this chapter represents more than a long-term shift from hospital-based to academically-based education. Hospitals with limited resources may reduce or eliminate clinical affiliations with education programs as well as closing their own sponsored programs.

As clinical affiliates attempt to trim their costs in response to reduced revenue, educators fear that hospitals will request remuneration for the supervision of students or seek other means of shifting costs back to the education institution. It appears, as of 1987, that this is not a large problem. When CAHEA queried education directors about changes over the past three years in the costs of the clinical portion of their programs, the directors responded as follows: 17 percent said they had experienced significant cost increases; 13 percent felt that program viability was threatened; and 15 percent perceived that the program had become a burden to the sponsoring institution. Only seven percent noted a significant change in curriculum (CAHEA, 1987). Allied health educators are also concerned about long-standing proposals to constrain or eliminate Medicare payments for education. Medicare currently pays hospitals for the direct education costs of allied health programs on a reasonable cost basis as an addition to the DRG (Diagnosis Related Groups) payment. Payments are intended for provider-operated programs and not for affiliated programs in which the hospital provides part of the clinical training. For the latter, the costs and benefits to the hospital are presumed to balance one another. Since the passage of the Prospective Payment System (PPS), there has been some confusion over whether the costs of jointly-sponsored programs are eligible for reimbursement.

Presidential budget proposals to terminate Medicare funding for hospital-based allied health and nursing education programs has added to the concern that hospital financial managers, looking for every opportunity to reduce institutional costs, will eliminate clinical affiliations when feasible. To those attempting to find new sources for federal budget reductions, the direct education pass-through represents an open-ended expenditure insufficiently targeted to the most important national manpower needs. Most often, this is thought to be the need to develop greater numbers of primary care physicians and fewer specialists.

In attempting to assess the impact of proposals to eliminate Medicare's education support, several recent studies sponsored by the Health Resources and Services Administration have generated a better understanding of the role that this source of education financing plays. A congressionally mandated study of nursing and non-physician (that is, allied health, as defined by the study) costs in programs approved for Medicare reimbursement, conducted by Applied Management Services, Inc. (AMS), reveals that together these programs cost Medicare roughly $226 million in the second year of prospective payment. This figure is relatively small compared with the $42.7 billion the government paid to hospitals under Part A Medicare for the same period. Analysis of Medicare cost reports indicate that non-physician health education programs cost the 514 providers in the program a total of $167 million. Nursing programs were more expensive, costing 547 providers $533 million (HRSA, 1987). Medicare pays only for its own share of the allowable direct costs.

Other studies (Lewin, 1987; Mathematica, 1987) have confirmed the observations of AMS in their interviews with directors of hospital education programs. Education programs offer numerous benefits to the employer, chief of which is the opportunity to recruit future employees. Additional benefits include motivating existing staff to stay current with advances in their field, and enhancing the reputation of the hospital by providing a community service to local education institutions.

Despite these benefits to employers, precipitate action to cut Medicare's education support runs the risk of destabilizing vulnerable allied health education programs. In the committee's view this is not worth relatively small, short-term budget savings. In the long run, Medicare beneficiaries would be harmed by limiting clinical experience for students. Moreover, many of these costs are likely to emerge later as potentially more costly recruitment and on the job training expenses.

Therefore, the committee recommends that until credible alternative approaches are developed, the federal government and other third-party payers maintain current reimbursement levels and mechanisms of support for clinical education.

The Comparative Cost of Allied Health Education Allied education programs are perceived by education planners and administrators to be high-cost programs. As a consequence, they can be prime targets for institutional budget reductions by central administration. Where state higher education funding formulas do not compensate for these higher costs, programs are exceedingly vulnerable to cost cutting measures when times are hard in higher education.

In an effort to better negotiate with central administration, there has been a growing interest in constructed cost models to help allied health deans and program directors explain why their unit costs may be higher. These models focus on key assumptions about faculty contact hours, faculty-student ratios, resource requirements for clinical experiences outside the department, and faculty salaries (Freeland and Gonyea, 1985). Although the models are useful tools for improving efficiency and then demonstrating those improvements to academic administrators, explanation does not change the reality that allied health education is faculty intensive; it necessitates clinical education experiences requiring coordination and supervision; and it often has extensive laboratory and space requirements.

The recommendations already made in this chapter will help address some of the weaknesses allied health programs have in competing for resources, but these measures are no substitute for actions many allied health schools must begin to take to generate the revenue needed to thrive. Medical schools have increasingly come to rely on incomes generated from faculty practices. Although such activities may not be appropriate or financially advantageous for many allied health fields, they may be so for some, if they are established with sufficient forethought and expertise. The notion of generating revenue by providing services needs further exploration, however. Services provided might be educational (extension courses or adult education, for example), or may involve innovative relationships with industry.

To enhance the stability of allied health education, national organizations such as the American Society of Allied Health Professions and the National Association for Allied Health should investigate models in which academic institutions have succeeded in broadening their financial base through such mechanisms as faculty practice plans, extension courses, and industry relationships. Those national organizations should also hold workshops to help institutions implement the models and to disseminate information.

In undertaking revenue generating enterprises, however, allied health deans will confront, and possibly exacerbate, a problem they have faced before. Faculty resources are stretched thin in order to control costs, and the excessive teaching load leaves little time for faculty to engage in scholarly activity, research, and college committee work. These activities, however, constitute a major portion of the traditional evaluation criteria for faculty promotion and tenure. They are, hence, the preferred non-teaching activities pursued by faculty wishing to advance their career in academe. Maintaining state-of-the-art clinical competence must further add to faculty's already excessive workload. Indeed, the committee heard deans complain of the difficulties their faculty members face in maintaining clinical skills and of the concomitant impact of this on preparing students for the labor market.

To ensure that faculty's clinical competence is maintained, the award system must be made to accommodate clinical competence, because faculty allocate what little time non-teaching time they have to those activities that are highly rewarded. The committee recommends that institutions offering allied health academic programs reward and encourage faculty clinical competence. Clinical practice that sustains this competence should be made a requirement for promotion.

It is noteworthy that this concern about the reward system is also one that medical educators have had to confront. As the president of the Association of American Medical Colleges has observed, "despite the realization that teacher-clinicians are essential ingredients of medical facilities, the need is often not recognized by the parent universities whose appointments and promotion policies leave no niche for the clinician-teacher to receive proper recognition" (Petersdorf, 1987).

Preparing Students For Tomorrow's Jobs

In principle, sound education planning would dictate that academic institutions base their program offerings on an understanding of the knowledge, skills, and socialization required of their graduates, not only for today's health care labor market, but for the future as well. By extension, statewide higher education planning should take into account the mix and distribution of personnel at different educational levels that will be needed across the state. Confounding efforts at such rational planning, however, are a lack of clear signals from the labor market about future human resource needs, and continuing controversy about matching education to the requirements of the health care delivery system.

Reflecting this controversy, an allied health education advisory committee in Texas highlighted a series of concerns that often surface when such groups view the broad spectrum of allied health fields (Allied Health Education Advisory Committee, 1980). These include:

- the growing amount of narrow specialization at all degree levels
- the requirements of some professional groups for higher levels of training for the professional entry credentials
- difficulties with transfer of credits to implement the career ladder concept
- the most appropriate level of training for various kinds of allied health personnel
- differences in programs needed to prepare practitioners, master clinicians, teachers, researchers, and managers.

Ironically, these are concerns today because in the past education institutions have responded to student and employer demands. Associate degree and certificate programs were developed to provide students who were unwilling or unable to spend four years in school before entering the workforce an opportunity to enter a field where those with the traditional higher credentials were in short supply. Academic health centers and four-year colleges, in addition to community colleges, sought to meet the needs of their own and local hospitals with two-year programs. Students with baccalaureates in other than health care fields were accommodated with certificate programs so they could pursue allied health careers.

Students interested in careers in respiratory therapy, dental hygiene, and radiography, which are principally offered at the associate degree level, are now able to enroll in programs that also allow them to obtain baccalaureate degrees. The result of all this was the opening of allied health occupations to a wider range of participants.

Having accommodated the needs of different student markets and employers who were either experiencing shortages in some personnel categories or who were attempting to structure their staffing with personnel of different education levels, the education system is now faced, not surprisingly, with a state of untidiness that planners find uncomfortable. Further complicating matters is the growing availability of graduate training. Although advanced degrees have long been accepted as serving to prepare faculty, administrators, and researchers, there is greater skepticism when it come to the elevation of a field's entry-level qualifications or efforts to develop specialities.

The committee acknowledges this great diversity in educational qualifications, but finds that a public policy problem requiring attention may not exist. The diversity in and of itself is not a problem. The test of whether specialization and changing qualifications or standards are dysfunctional is two-fold: (1) Is there wastefulness in student education investments? (2) Is the education system responsive to society's need for a manpower supply that permits the health care system to function efficiently and provide care of the desired quality?

Education Investment by Students The act of opening new education programs and admitting a class implies a contract with students containing certain assurances. No school can guarantee a student a job, nor guarantee that skills and knowledge acquired will be marketable in perpetuity. The committee believes that schools have the responsibility to make certain that: (a) professional education is training for a real occupation at the end of the line, (b) that the general education content is sufficiently balanced with occupation-specific skills, (c) that when, and if, students wish career advancement through education there is a relatively efficient pathway to follow, and (d) there is a realistic balance between the role aspirations of professions with the realities of day-to-day work. In fulfilling their responsibility to students, education decision makers face a number of dilemmas.

Real Jobs There are numerous job titles under the umbrella of allied health. Not all of them need to have separate, formal academic programs. However, educators must be sensitive to changing technology and disease patterns which may warrant such recent developments as genetic counselors and magnetic resonance imaging (MRI) technicians.

The Southern Regional Education Board has recommended—and the committee concurs—that academic institutions contemplating the development of new allied health specialties ask themselves three practice-related questions:

- Are there any legal or professional restrictions on the new practitioners that will tend to inhibit utilization of graduates?
- Is the new specialty sufficiently different from existing specialties to justify the development of a new educational program?
- What degree of liability does the supervisor of the new practitioners assume? (Southern Regional Education Board, 1980)

Liberal Education Faculty in professional or technically oriented programs in higher education face a continuing struggle to reconcile the demands of academia for scholarship and general education with the pressures from employers and accrediting bodies to prepare students for technologically demanding jobs. The argument on the side of liberal education is that the educational program ought to be providing preparation for life, not just for a specific job. Graduates must be prepared to respond to the inevitable changes in society.

Many educators feel the pressure exerted by employers (especially employers in fields that require familiarity with instrumentation) to get graduates who do not need extensive orientation. Even at the community college level, which has had a strong tradition of job orientation, there is concern about the appropriate mix of general education and technical/clinical coursework. In one small survey, 25 allied health community college deans reported proportions of general education to technical/clinical coursework credits ranging from 8 percent to 35 percent, with an average of 22 percent (Kaminski, 1987). In the name of responsiveness to a changing society, general education courses compete with pressures to incorporate geriatrics, computer applications, multi-competency, and clinical experience in alternative sites of care.

The committee is sympathetic to the dilemmas faced by curriculum planners. But it is also concerned that students receive the education foundation on which they can build a career if they so desire. This entails developing the capacity and interest in lifelong learning. Furthermore, if current skills become obsolete, practitioners have a base upon which they can develop an alternative career.

Articulation Elizabeth King, allied health dean at Eastern Michigan University, describes two hypothetical students to illustrate the personal dimensions of the problems of articulation, the process by which the upward educational transition among academic programs is achieved (King, 1985).

One student, having worked seven years as a certified occupational therapy assistant "with a love of the profession and a conscious decision to build upon her current skills," is confused and disillusioned when denied the opportunity to transfer her professionally related coursework toward an occupational therapy degree. Meanwhile, another student with an associate degree in general studies, hearing about the good job prospects for occupational therapists but having little knowledge about what occupational therapists do, is advised by the senior college that all his courses will transfer and he can complete the degree in two years.

In general, states have strongly promoted the concept of multiple entry and exit points in health careers to minimize the loss of student time in moving through certificate, associate and baccalaureate programs. Without strong mandates or incentives, however, such programs have difficulty overcoming some inherent barriers. King discusses a number of these: curricular problems occur in judging the compatibility of didactic and clinical content, and therefore it is difficult to assess advanced placement. There is at times a lack of communication between academic affairs and admissions offices to work out problems regarding credit transfer policies. Finally, and perhaps most important, faculty professional biases, in King's view "the most insidious barrier" create an environment of "undiscussable tension". These biases label community college students as "technically" trained and lacking in problem-solving experiences.

The committee recommends that alternate pathways to entry-level practice be encouraged when feasible. State higher education coordinating authorities and legislative committees should insist on flexibility in educational mobility between community colleges and baccalaureate programs.

Role Congruence A continuing tension exists between health care administrators and professional groups over the tendency of a field to assume more sophisticated or broader responsibilities and the perception of employers (or payers) as to the legitimate and valued functions that need to be performed for patients.

Professional associations and program faculty see their job as defining and shaping their discipline. This process gets reflected in curriculum content and is reinforced by accreditation.

Health care administrators become concerned when they believe the curriculum is being used as a precursor to expanding the legal scope of practice and reimbursement without recognition of what is possible or likely in practice, or when they believe that an occupation is at the same time abandoning "hands-on" patient care for "professional" responsibilities not valued highly by those outside the field.

Care must be taken, however, to assure that students do not get mired in these controversies. Ultimately, these issues are resolved by the market, as represented by consumer tastes and employer hiring practices, or by public policy as represented by reimbursement or licensure decisions. However, while these issues are in the process of being resolved the committee believes that educators have the responsibility for assuring that students have realistic expectations of what the world of work is today, not only what it might be in the future.

The Agreement Between Education and Services Along with the education program's responsibility to students is a responsibility to society in assuring that the health care system has the human resources it needs to function well. Indeed the rationale for the committee's support of public intervention in allied health supply issues is based on its belief that the link between service and education needs to be strengthened.

In determining their program offerings, allied health educators are cautioned by state higher education leaders and health care administrators to avoid overtraining in both curriculum content, length, and level of preparation. On the other side are the professions who caution against too little training and who strive to elevate education standards through licensure, program accreditation, and reimbursement standards.

The committee has heard arguments by the first group that raising educational qualifications is not only expensive to the student but to the education system and the health care system as well, both of which are attempting to control costs. Furthermore, proponents of this view contend that "education creep" exacerbates shortages by lengthening the time required to prepare an individual for work. They also contend that there is little evidence to suggest that current levels of education are creating care problems.

Counter arguments are most often based on the expanding knowledge base that practitioners need to master, and the limited time available in the curriculum. New sites of care, such as in the home or in independent office practice, require a level of judgment that can only be achieved with increased education. Those concerned with an adequate supply of practitioners point to the higher labor force participation rates and longer tenure of those who have already attained the higher credential.

This committee encountered a number of these types of controversies among the allied health fields. For example:

- physical therapists attempting to establish the master degree as the entry-level standard

- role delineation debates among baccalaureate medical technologists and two-year medical laboratory technicians

- proposals to limit the educational routes to entry-level dietetics

- movement of respiratory therapy to a baccalaureate entry-level standard.

The case for promoting a single optimal level of education is an exceedingly difficult one to make on empirical grounds. When an Institute of Medicine committee explored the controversy over the three educational tracks leading to the registered nurse credential (associate degree, diploma, and baccalaureate), it was unable to find convincing evidence on the performance difference of graduates (Institute of Medicine, 1983).

The committee neither endorses nor refutes the position of parties on either side of these debates. In view of the lack of objective empirical evidence and the limited scope of the present study, the committee could not justify offering conclusions that might influence the outcome of these controversies. The committee does suggest, however, that those making decisions make sure that changing existing practice will not limit supply and not make care excessively costly.

From the committee's perspective the only sensible response to the moving targets of health care system change and the lack of certainty about how to match education to future needs is a continuing feed-back loop between education and practice. Graduate follow-up studies that incorporate employer perceptions are the most direct measures of how well the curriculum is preparing students. The aim of these studies however, need not solely be to tailor education to employer perceptions of need. Rather it should be the start of a dialogue. If students are not applying their education experiences fully, the problem may at times rest with the work environment. A dialogue could potentially lead to a mutually beneficial set of activities involving more participation from health care managers in curriculum design and greater involvement of educators in health services research with practical application to clinical settings.

Various models are available for institutionalizing such interactions. In some education programs, allied health education and services are jointly administered by the same corporate entity. An example is Rush University in Chicago where education and services are unified. Where this is not feasible, industry advisory boards common to many community colleges can be utilized. Faculty practice plans or clinical affiliations may also serve as a starting point to stimulate collaboration.

In those fields where instrumentation plays a major role in job functioning, industry/faculty collaboration provides a largely untapped resource. Manufacturers ultimately have a stake in human resources, because investment in technological innovations by health facilities may be seriously hampered if there is a lack of adequately prepared personnel. Manufacturers should consider collaborating with education institutions in creative ways—the use of equipment, faculty-industry research projects, short-term employment opportunities—as a means of ensuring a human resource infrastructure to assist technology transfer.

Some stimulus, however, is necessary to overcome the inertia of dealing with these tough issues of collaboration. The committee sees a role both for states and private foundations in providing that stimulus.

State legislatures should establish special bodies whose primary purpose would be to address state and local issues in the education and employment of allied health personnel. Private foundations should support university-based centers for allied health studies and policy to provide a critical mass of researchers and resources to advance technology assessment, health services research, and human resources utilization.

States have a major role in allied health education by virtue of their support of public colleges and universities. In addition to this influence, they are frequently drawn into debates over licensure issues involving changing scopes of practice and licensing of new occupations (These regulatory issues are discussed in Chapter 7).

Private foundations could have a major impact on the future of allied health education and practice by creating centers of excellence in a few academic institutions. Many advantages might be gained by coalescing a core research faculty who also provide services. These mutually re-enforcing activities would enhance the quality of research and patient care. Furthermore, these centers might then serve as a resource to other allied health education programs regionally or nationally.

The committee believes that the interest of states legislatures and private foundations in the endeavors we describe will be kindled and sustained only by a continuing federal presence in the concerns of allied health education and practice. For this reasons, the committee makes the following recommendation about the federal leadership: The Department of Health and Human Services should maintain an organizational focal point on allied health personnel to implement the grant programs recommended in this report, to coordinate the recommended work of the interagency data task force, (recommended in Chapter 2) and to facilitate communication between state legislative committees and the federal government.

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CHAPTER 6

THE HEALTH CARE EMPLOYER'S PERSPECTIVE

Many of the themes that run separately through this report come together when we begin to view allied health workers from the perspective of health care employers. If the supply of practitioners in an allied health field declines because fewer students choose the career or because schools close, health care administrators who employ allied health personnel are among the first to experience the change. If licensure laws change or a new technology is introduced, employers are among the first to respond to the change. If a glut of workers in an allied health field exists in a locality, employers will notice it in the response to vacancies they advertise.

Employers are not merely users of a given supply of allied health personnel, however; they are also active participants in the forces that determine the supply of workers. In other words, the quantity demanded and the quantity supplied are not independent. Wage and salary rates, and working conditions affect the supply of workers. The supply of workers in turn affects the wages and salaries, and working conditions that are offered. But employers setting wage and salary levels have to balance many considerations other than the amount of pay needed to attract the required number of workers. They must consider the payment they can get for services and the bottom-line impact of personnel expenses, the regulatory requirements that constrain manpower deployment, and the skills and knowledge demanded by the technologies used.

In the past, cost-based reimbursement, the absence of competition, and a generally adequate supply of allied health personnel allowed administrators to make the salary adjustments needed to maintain their desired staffing levels. They have been able to accomplish this without appreciably changing staffing or service levels or the deployment of staff. But changes in the health care system and in allied health labor markets may force administrators to rethink staffing practices. There will be increasing competition for technically-oriented workers who have more options than non-technical workers in where they may work. Also, administrators will have strong economic incentives to control personnel costs in order to compete on price yet remain financially viable.

These changes constitute a new environment with which administrators have little experience. Although some administrators have had to face periodic shortages of nurses, only recently have they faced personnel shortages and the new economic environment simultaneously. There is no history to indicate how employers will adapt to difficulties in hiring and staffing.

The committee identified some allied health professions in which shortages are likely to occur if changes in the labor market fail to take place. This chapter focuses on forestalling shortages; it emphasizes the importance of planning for the future. Market mechanisms will force adjustments that will eventually decrease stresses in the allied health labor market. But markets adjust slowly. For example, there is a considerable time lag between educational institutions recognizing and responding to increased student interest in an allied health field and an increase in the number of graduates. Employers have numerous reasons to act early to forestall shortages. For instance, acute shortages of workers in an allied health field may cause salaries to rise sharply, some services to close, or the initiation of a new needed service to be postponed. More subtly, the quality of care may be eroded if, over extended periods of time, existing employees must struggle to maintain services. These and other serious service dislocations could be reduced if administrators respond to early market signals.

In this chapter we will focus mainly on what personnel administrators, corporate human resource administrators, and department heads in all types of health care facilities—hospitals, nursing homes, freestanding facilities—might consider doing to help relieve or prevent manpower shortages. The chapter will discuss two types of activities that can produce gains in manpower supply. One is to make employment more attractive. The other is to use the available workforce more effectively. None of the activities discussed are new; they have been tried in fields other than allied health. There is a need for further investigation to ascertain which activities are best suited to resolve problems with the allied health labor force, taking into account the different characteristics of the workforce in each field.

There are other ways that health care providers can initiate activities to lessen their problems. For instance, Texas hospitals have responded to shortages by using the state hospital association to mount an elaborate campaign to recruit high school graduates into health careers (Texas Health Careers, 1987). Other mechanisms, such as offering vacationing high school students jobs in health care facilities, are also used to inform and encourage students to select health care careers.

Throughout the chapter terms such as human resource administrators and facility administrators are used. These terms are purposefully vague. Health care organizations today often have a personnel function to facilitate the details of personnel management, departmental administrators who make decisions about the deployment of staff in their realm of responsibility, and upper-level human resource administrators who deal with facility-wide labor force issues. This fragmentation will make it difficult to develop and implement creative staffing arrangements that are likely to be part of the solution to allied health staffing problems.

Strategies for Employers to Enhance the Supply of Allied Health Practitioners

Given the diminishing size of the college-age population, students' propensity to choose careers outside of health care, and the decreasing availability of allied health programs on the one hand, and the aging of the population, disease patterns, and technological advances in health care on the other, there will be an imbalance between supply and demand for some groups of allied health workers unless there is a change on one or both sides of the equation. However, generalizations of this sort do not apply to all allied health fields or to all locations. Demand and supply vary from place to place, and with varying circumstances. Individual facilities, areas, or regions will in some cases experience an adequate or even excess supply of personnel in fields where a national shortage is predicted, and the balance between supply and demand will differ among the fields. This is readily apparent today as facility administrators struggle to hire physical therapists in locations where, for example, respiratory therapists are plentiful.

The expectation is that in many parts of the nation and for many employers of allied health practitioners the labor market will be tight. Two types of actions are available to relieve the pressures of personnel shortages: one is to increase the supply of workers, the other is to use available workers more productively and effectively.

To increase the supply of workers, employers can intervene to make education more accessible, and can make employment more attractive. Students may then be more likely to select allied health careers. People who have left the workforce to pursue other interests—children, new careers, or leisure—may return. Workers may choose to remain in the workforce longer, or remain in a career longer. Increasing supply by encouraging greater numbers of students to enter the allied health fields is a strategy that depends both on employers making allied health employment more attractive and on education institutions responding to increased demand by potential students.

The other strategy for coping with shortage, using workers more productively or effectively, in essence reduces demand for allied health personnel at a given level of output. But there are limits to the productivity improvements that can be achieved. These limits can result from regulatory constraints, the skills of individuals, technological constraints, as well as the nature of the work. The challenge for administrators in today's competitive health care environment is to try to ensure that productivity improvements are pushed toward the limits.

Undertaking one or both of these strategies would require serious reconsideration of the role of human resource management. For many facility administrators it would mean giving human resource management a higher priority than in the past. However, such investments, or efforts, would be repaid if the service dislocations that could result from tight manpower markets were avoided. Moreover, private sector employers must take the initiative in enhancing the supply of allied health personnel. The public policy options, such as programs of grants or scholarships, cannot on their own solve manpower problems. Making education inexpensive and readily available might succeed in attracting some people into allied health fields, but unless there are "good" jobs offering competitive wages the number of people attracted will be inadequate, and those that choose an allied health occupation will not stay in it long.

Salaries

In a perfectly competitive market, an imbalance between supply and demand would cause price to change until supply and demand were in equilibrium. Thus, if a shortfall of allied health personnel were to occur wage rates would be expected to rise, demand to fall, and the supply of personnel would increase to match demand. This series of reactions is likely to occur in the allied health personnel market. But market forces do not always work freely, and there can be delays before equilibrium is reestablished. If demand increases at a greater rate than supply, wages may rise but there will be a lag before supply catches up with demand. Also, wage rates may be slow to respond to supply shortages if employers are unwilling or unable to raise wages. An explanation offered for the slow adjustment of nurses' compensation is that large health care providers, such as hospitals, have often been one of just a few employers of allied health practitioners in a locality, and realizing that these practitioners have few alternative places at which to work, employers have been able to keep wage rates down (Aiken, 1987). However, in many local markets competition for allied health practitioners has been increasing with a proliferation of worksites—freestanding units of numerous types, sometimes independent practice options, etc. Slow wage adjustment can be expected if employers do not recognize that wage competition is taking place. There are also many reasons for being reluctant to adjust wages.

Sometimes employers recognize that competition for workers is occurring but are unable to compete with salaries offered by other organizations. Some types of employers for whom this is likely to be true are discussed at the end of this chapter. During the course of the study, the committee often heard of allied health practitioners leaving traditional employment settings to establish independent practices or to work for employers such as health spas, food manufacturers, and biotechnology firms, where substantially higher salaries are being offered. The committee also heard that the traditional service ethic that attracted individuals to relatively low-paying health care jobs is being eroded. Opportunities in alternative places of work or higher paying careers are felt to overwhelm the traditional service satisfaction.

Employers' reluctance to respond to indications of shortage by raising salaries stems not only from the expense of paying higher wages to the scarce group, but also because the compensation of many types of workers in a hospital are set in relation to each other. An increase for one type is likely to be quickly followed by increases for other types.

Such failures of the market are not unique to health care providers. The Wall Street Journal (Mitchell, 1987), noting a serious shortage of blue-collar skilled craftsman, remarked,

> Surprisingly, the labor market has sparked only modest wage gains so far. Although desperate for certain key skills, some employers would rather limp along without a full workforce than raise wages high enough to attract needed workers . . . many companies have chosen to ignore issues of supply and demand for fear that higher labor costs will make it more difficult to compete.

In health care a similar attitude prevails. The New York Times (Uchitelle, 1987) cites Jerome Grossman, chairman of the New England Medical Center, where 200 of 2,800 jobs are vacant, as saying "The amounts we can charge patients are capped and so . . . we are forced to make trade-offs." Moreover, there are sometimes alternatives to pay increases. For example, when laboratory technicians are in short supply chemists and individuals trained in other relevant disciplines can be substituted. If there are alternative sources of manpower, such as lower- level practitioners or individuals with other training, substitution may be a preferable to raising pay. For example, in one locality where there is an oversupply of dentists and a shortage of hygienists, an HMO uses dentists to perform the hygienists' tasks. In some allied health fields freedom to substitute is constrained by regulation.

Alternatively, services can sometimes be marginally curtailed and in other cases allied health employees are asked to work overtime and measures are taken to increase output.

Other ways of attracting personnel through economic incentives without increasing wages or salaries include paying bonuses for joining and staying on staff, and offering continuing education and daycare subsidies. This avoids an upward shift in pay scales, so if utilization or occupancy declines the employers are not left with an excessively highly paid staff and a plentiful supply. Evidently health care administrators, necessarily concerned with their organization's bottom line, have available an array of strategies that can be implemented before wage rates are increased, thus a lag in the response of wages to a perceived shortage of personnel is not unexpected.

Although raising salaries has been shown to increase the size of the nursing workforce, other economic factors also influence the decision to work. Family income is important. As spouses' incomes rise nurses tend to reduce their working hours or stop working altogether. And when nurses' salaries become high enough, some nurses reduce their hours of work. Conversely, in time of high unemployment inactive nurses return to the workforce (Aiken, 1982). These phenomena are likely to occur in some of the allied health fields, particularly those that are mainly composed of women and are similar to nursing in education, and pay levels.

An analysis of nurses' compensation in relation to changes in the balance of demand and supply of nurses notes that sometimes wage increases have lagged behind shortages. The same analysis notes that wage increases have repeatedly succeeded in reducing shortages (Aiken and Mullinex, 1987; Buerhause, 1987).

Pay differentials between different educational levels of the same occupation also have the potential of increasing or decreasing the supply of personnel of a given level. For example, when there was no difference between the earnings of baccalaureate nurses and associate degree nurses, students realized that the economic return to the two-year education was higher than to the four-year program and the number of associate degree graduates eventually exceeded the number of baccalaureate graduates (Buerhaus, 1987).

Pay levels affect the supply of allied health practitioners at each point at which an individual makes a career decision. Although economic considerations are often not the sole or primary considerations, earnings potential is one of many factors considered by students selecting an educational program. Once started on a career, satisfaction with current earning levels and expected increases in earnings will figure in decisions to continue working, to leave the workforce, to pursue child care, leisure or other unpaid activities, or to change to another occupation in which the compensation is better. Similarly, return to an occupation will be in part dependent on pay levels—especially when the cost of work includes major expenditures such as child care.

How does allied health compensation compare with other occupations? First compensation for allied health practitioners should be understood in the context of women's earnings, because women dominate many allied health fields. In 1986, women earned on average 69.2 cents for every dollar earned by men (Mellor, 1987). Moreover, occupations in which women represent the majority of workers tend to rank lower in terms of earnings than male dominated occupations (Rytina, 1987). The American Physical Therapy Association (APTA) is one group trying to address these problems. They recently examined factors contributing to the disparity in professional and economic status between men and women members as indicated by self-employment, administrative responsibility, graduate degrees, and earnings. Full-time salaried female physical therapists had annual salaries that were only 85 percent of those of full-time salaried men. Self-employed physical therapists are more likely to be men (62 percent) and they earn more than self-employed women. The annual gross earnings of these women was 71 percent of self-employed men. The APTA study concluded that the association should explore approaches for creating career ladders, encourage women to commit themselves to careers and maintenance of skills and consider societal barriers that limit womens' aspirations and opportunities (Reagan, 1986).

Table 6.1 arrays compensation data for some allied health fields and selected other occupations. The data for allied health fields were obtained through a national survey of 33 hospitals, 16 medical schools and 28 medical centers. These institutions were chosen for their similarity in size to the University of Texas Medical Branch at Galveston, which has 11,000 beds and 7,500 employees. Thirteen of the institutions are in Texas, Arkansas, and Louisiana, which represents an over-sampling of that region. Thus the data pertain to large institutions and have a regional bias. The occupational categories are carefully defined and clear, and although the Texas region is over-sampled there are no other reasons to believe that the manpower markets of the institutions have any special characteristics. On Table 6.1 the starting rate refers to the rate normally paid to fill a vacancy in the occupation. The maximum rate is the highest rate actually paid to employees in the occupation (University of Texas Medical Branch, 1986). Data for the other occupations are from a nation-wide salary survey of firms with at least 50 employees. Each occupation was divided into levels with detailed job content descriptions for each level. For the non-allied health fields the starting salary in Table 6.1 is for the lowest level, maximum is for the highest level (Bureau of Labor Statistics, 1986).

Some of the occupations selected for inclusion in Table 6.1 were chosen because they require investments in education comparable to the allied health fields. Others were chosen to show how compensation for a smaller educational investment compares with allied health fields. The table indicates that starting salaries for allied health fields in some cases do not compare unfavorably with other occupations requiring similar educational investments or which students might consider as alternative careers. For example, auditors and accountants require bachelors degrees and have monthly starting salaries of $1,797 and $1,752, respectively; these are similar to or a little below the starting salaries for physical and occupational therapists and medical record administrators who also require bachelor degrees. In computer fields the starting salaries of systems analysts exceed the starting salaries for speech-language pathologists and audiologists for whom a master degree is the entry level requirement. Engineering technicians, described as "semiprofessional", and computer operators are included in technical support operations and can be considered equivalent to medical laboratory and medical record technicians with associate degrees.

TABLE 6.1: Monthly Salary Ranges of Selected Allied Health Occupations and Other Occupations, 1986

Occupation	Mean Starting Rate	Mean Maximum Rate	Percent Difference
Audiologist	$ 1,872	$ 2,334	25
Dietitian	1,676	2,196	31
ECG Technician	1,073	1,332	24
Medical Lab Technician	1,222	1,622	33
Medical Record Administrator	2,076	2,637	27
Medical Record Technician	1,272	1,595	25
Medical Technologist	1,630	2,174	33
NMR Technologist	1,596	2,033	27
Occupational Therapist	1,777	2,219	25
Physical Therapist	1,845	2,338	27
Radiologic Technologist	1,435	1,900	32
Radiation Therapy Technologist	1,651	2,094	27
Respiratory Therapist	1,481	1,855	25
Speech-language Pathologist	1,857	2,318	25
Accountant	$ 1,752	5,129	93
Accounting Clerk	1,043	1,823	75
Attorney	2,584	8,431	226
Auditor	1,795	3,309	84
Buyer	1,770	3,442	94
Computer Operator	1,144	2,416	111
Computer Programmer	1,736	3,578	106
Drafter	1,088	2,584	137
Engineering Technician	1,407	2,726	94
Engineer	2,322	6,585	183
File Clerk	861	1,302	51
Secretary	1,361	2,338	72
Stenographer	1,531	1,812	18
Systems Analyst	2,428	5,981	173
Typist	1,049	1,404	34

SOURCE: National Survey of Hospital and Medical School Salaries, University of Texas Medical Branch at Galveston. November 1986.
National Survey Professional, Administrative, Technical and Clerical Pay. March 1986.
U.S. Department of Labor, Bureau of Labor Statistics, Bulletin 2271. October 1986.

Engineering technicians start at salaries roughly $150 per month higher than the equivalent allied health fields; computer operators start at roughly $100 per month lower. It will come as no surprise that attorneys and engineers start at salaries closer to the mean maximum rate than to the starting salary for speech-language pathologists and audiologists.

Increases in earnings over the length of a career are substantially lower in allied health fields than in the other listed occupations. The salary spread for each of the non-allied health fields listed, except typists, is larger than the spread in any allied health field.

In sum, the data indicate that although allied health practitioners' starting pay is not always competitive with the earnings of workers in alternative fields, the differences are not large. However, the relative lack of a "pay ladder" puts individuals who stay in allied health at a significant economic disadvantage. Although there is no empirical evidence that prospective students turn away from allied health careers because of wage compression, it seems likely that students know of and react to it by seeking careers with brighter economic futures.

An important factor for employers considering raising pay to alleviate personnel shortage is the worth of the job to the institution. This factor is brought out starkly when administrators consider the costs and benefits of expanding the pay ladder, in other words, paying more for experience. In some facilities, and for some allied health fields, experience may be of little value from the employer's perspective. Indeed, recent graduates may be preferable if they bring more up-to-date skills or the enthusiasm of a novice. Why then should an organization reward experience? One answer is the high cost of recruitment and orientation. In addition, some would say that treating employees like disposable objects, not recognizing loyalty or tenure, is simply inhumane management. Furthermore, by combining further education with pay and career progression, quality may be upgraded and advances in knowledge can become incorporated into the facility's practice. This latter point becomes more important if the stream of newly trained practitioners slows. Employers who must substantially increase pay to attract needed personnel may consider examining job content and restricting tasks to ensure that the now more expensive personnel are used effectively. If higher compensation succeeds in increasing by even small amounts the time that individuals remain in the allied health workforce (either by continuing to work or by returning to work) the impact on supply can be significant.

Although supply problems may be alleviated by increasing compensation, employers may have reason to be reluctant to act. The most fundamental and obvious reason has to do with the facility's bottom line. Higher salaries may not appear justified by the revenue generated for a service. Or, the impact on other occupations' salary expectations of raising one occupation's salary may deter some managers from utilizing this tool.

Hospitals are facing price competition and prospective payment and their financial administrators feel they have reason to be reluctant to increase salary expenses. At a recent Senate Finance Subcommittee hearing a spokesman for the American Hospital Association said that the level of Medicare payments constrained hospitals' revenues so that nurses' salaries could not be increased (Health Professions Report, 1987). However, data indicate that the early 1980s have been relatively profitable for hospitals. Hospital operating margins—key indicators of fiscal health—peaked in 1984 (see Table 6.2). By September 1987 total operating margins and patient revenue operating margins in community hospitals were close to the levels of the early 1980s, and there were no signs that the deterioration in financial status had ceased. However, operating margins in the 1960s and 1970s were consistently lower than in the 1980s. Thus, although some hospitals are running in the red, and the situation for the average hospital has deteriorated in the past few years, hospital administrators with longer memories may not be feeling so pressured that salary increases cannot be considered.

Furthermore, hospitals' financial viability rests to a great extent on their ability to admit and care for patients. If lack of staff in any allied health field interferes with this ability, or slows down discharge, an increase in wages is likely to be more than offset by revenue increases or decreases in other costs.

Indeed there may be no choice for employers in need of scarce allied health employees. As one observer put it,

> Gone are the days when doctors and hospitals could look upon America's bright and motivated women as a source of cheap labor denied economic opportunities elsewhere. To attract this pool of talented workers into health care, we must get used to the notion of paying competitive wages (Reinhardt, 1987).

TABLE 6.2: Operating Margins for U.S. Community Hospitals, 1963-1987

Year	Operating Margin Total Revenue	Patient Revenue
1963	2.5%	- 6.0%
1965	2.3%	- 5.1%
1967	2.6%	- 4.6%
1969	2.4%	- 3.9%
1971	2.3%	- 3.2%
1973	1.2%	- 4.4%
1975	2.3%	- 3.0%
1977	3.5%	- 0.6%
1979	3.9%	- 0.6%
1981	4.7%	0.2%
1983	5.1%	1.0%
1985	5.2%	1.5%
1987*	4.8%	0.3%

SOURCE: National Hospital Panel Survey, American Hospital Association, Hospital Data Center.

* January through November.

Other Strategies to Increase Job and Occupational Tenure

> A review of the recent periodical literature of hospital administration reveals scant coverage of human resource management. Most of that attention is focused on short-term issues in spite of radical and long-term changes in the hospital's environment as the nation redefines how health care is perceived, delivered and paid for. (Mansfield, 1987)

So opens the report of a literature review of the nine major hospital administration and personnel journals for the years 1983 through 1985, forcing the conclusion that human resource management is not a high priority for health services researchers nor for their audience of health care corporate executives and hospital administrators. This is a surprising finding when one considers that payroll represents about half of hospital expenses. The review also noted that of 157 articles related to human resources, 71 percent were published in Nursing Management. Our own search of the Cumulative Index of Nursing and Allied Health Literature (which covers nursing and allied health personnel) and of selected psychological, management, and popular publications, was similarly revealing. Searching literature published since 1983 on such descriptors as the occupation titles of each of the ten allied health fields covered in this report, manpower, turnover, retention, and personnel, a total of 36 articles were found. Thirty related to nursing.

Human resource administrators are often in a perplexing situation. They manage a resource that is fundamental to ensuring care of the quantity and quality desired by management, and whose cost accounts for a major portion of the facility's expenditures. But, as the committee heard at one of its workshops, during site visits, and through discussions with knowledgeable observers, the human resource function is not often given the visibility or status it needs to perform its complex job. Moreover, even large health care corporations have not generally changed the way human resources are managed as the organizations adapt to the changing health care environment.

Human resource administrators are most often expected to respond to and implement strategic planners' decisions. But strategic plans do not always recognize the constraints and changes in labor markets that are realities for human resource administrators. If, however, strategic management and human resource management were brought together, several benefits could ensue. The importance of human resource management as a vital part of facility management would be confirmed. Plans would be made with cognizance of labor market conditions, and human resource administrators would be in a position to act early to implement plans in whose development they have participated.

But, more often, personnel administrators must assemble a labor force to provide services, as decided by other administrators. It is not until labor markets become tight that upper management supports serious efforts to retain and attract allied health practitioners.

The previous section suggested that increased pay would enhance supply. But money, although important, is only one of the many factors that make employment in a field an attractive alternative to leisure, home activities, or another types of employment. What makes employment attractive? What non-monetary aspects of a job cause satisfaction or dissatisfaction? The knowledge base for answering these questions about allied health fields is sparse. A review of the general job satisfaction literature notes that explanations of differences in satisfaction are usually related either to individual characteristics of workers, including their needs and values, or to the nature of the jobs and characteristics of employing organizations (Hanson et al., 1987).

Employers should not assume that factors they cannot control, such as family responsibilities, dominate employee decisions. A review of studies of self-reported reasons for resignation of nurses notes that at least one-third of resignations resulted from job dissatisfaction, and a recent study attributed three-quarters of "contemplated turnover" to job problems (Weissman et al., 1981).

Workers' job requirements are known to vary according to sex, race, age, and so on. The Hudson Institute in its project "Workforce 2000" drew some conclusions about workforce problems that employers will have to address if they want to hire the workers of the future. With the increasing age of the workforce they must be concerned about these workers' adaptability and willingness to learn. With regards to working women, reform is needed in day care, time-off, policies to assist welfare mothers in entering the labor force. The full utilization of the workforce will require integrating blacks and Hispanics into the labor market, but that means overcoming the fact that they are also least advantaged in society with respect to skill levels and educational backgrounds (Hudson Institute, 1987). Employers working with an allied health workforce that is largely composed of women will want to pay attention to findings about what makes a job appealing to women. Some suggest that women's unique work needs stem from their dual responsibilities at home and at work. Studies indicate that factors such as travel time from work are more important to women than men. For those women who are not career motivated but more interested in supplementing the household income or getting out of the house, jobs that substitute other rewards for advancement, stability and high pay may have attractions (Hanson et al., 1987). Some differences in workforce behavior between men and women include women being less likely to remain in one occupation and one particular job than men, and having more frequent career interruptions—although this latter difference may be diminishing. Women pursuing longer-term careers are less likely to differ from men in the factors that contribute to job satisfaction.

For many workers satisfaction, dissatisfaction, and decisions to leave or stay in a job or field are related to factors to do with their tasks; how they fit into the organizational structure; and their expectations about their conditions of work. The nursing literature is replete with analyses of reasons for dissatisfaction—boredom, limited possibilities for advancement, lack of status, not fully using skills, lack of further educational opportunities, lack of autonomy, problems in relationships with physicians, and staffing patterns that do not allow for the provision of high quality care. (See for example Price and Mueller, 1981; Weisman et al., 1971, and a review of the literature that notes that every major study since the 1960s has pointed to the factors of autonomy, interpersonal relations, and job status as critical components of job satisfaction, Institute of Medicine, 1983). Satisfaction often stems from recognition by peers and supervisors, professional growth, feeling important to patient care and to the institution, and involvement in decisions concerning both patient care and institutional policy. An analysis of the importance of these factors in determining turnover found that autonomy is the strongest predictor of job satisfaction, and the supervisor's responsiveness to the nurses' work and communication needs is the best predictor of a sense of autonomy. (Weisman, et al., 1981).

Findings of this sort have generated numerous strategies (not always adopted) to enrich nurses working environment in order to extend both job and occupational tenure. Strategies include creating decision-making links between the chief executive officer, nursing service administrator and staff nurses; introducing primary nursing and developing patterns of upward mobility. One important difference between nursing and allied health in this regard is that although allied health practitioners hold administrative jobs, managing laboratories, dietary services, radiology departments and so on, there is usually no umbrella allied health administrator position to promote the interests, and raise the level of visibility of the allied health workforce. By way of contrast, hospitals commonly have a director or vice-president for nursing, and increasingly they are assuming even broader responsibilities such as vice-president for patient services, which sometimes subsumes allied health services. The fragmented, diverse nature of allied health makes the development of a unified power block within institutions difficult. Establishing the linkages to central administration that have been helpful in addressing work environment issues for nursing, is thus inhibited for allied health.

The nurse-physician relationship is an important factor in the way nurses perceive their roles and satisfaction. For many allied health practitioners, physicians too play a major role in generating an environment that will induce practitioners to extend their tenure. Reporting on a successful effort to lengthen nurses' tenure one nursing administrator noted:

> The physician's role in nurse retention cannot be overstated. When there is close communication between physicians and nurses, an increased level of satisfaction for both parties is evident. Nothing enhances the role of the nurse as much as awareness that a physician is hearing her perspective of a patient care issue. Orthopedic physicians and orthopedic nurses simultaneously requested that nursing practice be expanded to include more activities. Nursing activities then were planned and implemented as a joint venture. (Araujo, 1980).

Reports like these speak to the importance of facility administrators encouraging physicians to be involved in efforts to extend tenure.

Also of importance is the role of research. Knowledge of the factors that persuade practitioners to leave or stay in their allied health field could usefully be expanded—and what seems obvious is not always the right answer. For example, a small study of burnout among respiratory care personnel found, to the author's surprise, that hours worked per shift or per week, shift assignment, frequency of rotation of daily work assign- ments, variety of procedures performed, or treatments per shift, did not relate to burnout. Lower burnout rates were found in practitioners with higher educational levels, a greater sense of autonomy, and perceptions of high quality work being done in their departments (Shelledy and Mikles, 1987).

But, just as with salary decisions, it is unreasonable to expect facility administrators to make changes not in their institution's interests. Although providing opportunities for upward mobility is generally seen as an important element in generating job satisfaction, there are clearly limits to the number of higher level practitioners needed. In some cases any sort of upward mobility may be impracticable. As an alternative, employers may find that encouraging an expansion of skills to another area can sustain employee interest and extend tenure in work that could become tedious. Methodist Hospital in Indiana sponsors a program called "Add-A-Comp" that enables individuals with health care experience to acquire additional competencies. This fulfills employers' need for cross-trained personnel. Moreover, employees who are more challenged and stimulated are less likely to leave an employer or the workforce.

A secondary benefit of improving job satisfaction will accrue to employers interested in avoiding unionization among their employees. Health care union membership, which has been rising despite a national decline in other union membership, stands at about 20 percent representation. Recent organizing issues have included quality of care, quality of work, stress, job restructuring, and benefits. Because of similar concerns with issues of compensation, job security, and meaningful work involvement, professionals and white collar workers are identifying with blue collar workers, and identifying with unionized groups (American Hospital Association, 1986). Thus, employers cannot rely on employees' sense of professional status to avoid unionization. However, by making adaptations to increase job satisfacton they are attending to issues that might otherwise result in union activity.

Lower-level health care practitioners, such as orderlies and technicians, have negotiated contracts that include retraining programs in case of layoff. As a result a hospital has started training programs for sterilization technicians and licensed practical nurses (Lunzer, 1987). Organizations that have these sort of contracts have a ready pool of workers whose training can be channeled towards skills needed by the facility. Thus, although unionization can reduce employers' ability to redesign jobs and reduce workforce flexibility, it can also on occasion increase the options in uses of manpower.

Job satisfaction also relates to the socialization into the profession that occurs during education and contact with role models. This socialization emphasizes the importance of upward mobility. Studies of nursing indicate that the higher the level of education the greater the likelihood of job dissatisfaction (Weissman et al., 1981). Although this could be related to frustrations that occur if practitioners do not fully use their skills, the research findings of job dissatisfaction relating to upward mobility, role, use of skills, and autonomy, all point to the conclusion that some discrepancy exists between what employers need and the aspirations and needs of graduates from educational programs. More extensive communication between educators, employers and professional associations might help to improve the fit between needs of employers and their employees, and thus help extend job and occupational tenure.

The problem of matching education with work place needs is also addressed in Chapter 5 of this report, where education issues are discussed. That chapter contains a recommendation that the groups most influential in developing worksite tasks, curricula, and aspirations--the triumvirate of educators, employers, and professional associations—establish greater interaction. One special problem that might be addressed by the group is to attempt to ensure that the diversity of employers' needs are matched by the diversity in the education of practitioners. Allied health jobs exist in numerous settings—hospitals, nursing homes, primary care practices, etc. Settings vary in their need for different ranges of skills and

and levels of expertise, even in a single field. Reflecting this diversity in the content and level of education programs would help increase job and occupational tenure by matching practitioners' abilities and aspirations with patient and institutional needs.

Another issue that could usefully be addressed by employers, professional associations, and educators also relates to professional aspirations. Allied health practitioners working in health care facilities of all types become part of a larger group of workers with an organizational structure. The "medical model" of autonomous work, which is pursued by many physical therapists, speech-language pathologists and laboratory technologists who become independent consultants, is not always either realistic or attainable in complex medical settings and for most practitioners. These practitioners need goals that provide satisfactory alternatives to independent practice.

A further element, already touched on in Chapter 5, is the provision of clinical sites for education. The number of health care facilities providing sites for the clinical component of education programs is decreasing. Employers should consider that the cost of providing clinical education is in the long run often offset by a bolstered supply of practitioners and avoidance of personnel shortages.

Enhancing the Use of the Existing Workforce

Easing scarcities in the supply of allied health practitioners by expanding educational capacity is a strategy that only begins to be effective several years after initiation. More immediately effective would be extending the tenure of existing workers, and bringing back into the workforce individuals who have chosen to leave it. A different approach is to examine ways of using the existing workforce more productively and effectively.

In the early part of this chapter it was noted that when demand for allied health practitioners exceeds supply market forces will drive up the amount that employers will have to pay to hire the needed personnel. This will in the long run improve supply. It will also diminish the upward thrust of demand as employers, with a more expensive workforce, seek ways of containing this expense. An approach that has the potential of providing a dual benefit—increasing job satisfaction as well as using staff more efficiently—is restructuring of tasks and staff deployment. This requires that administrators shed traditional ways of thinking about individual and departmental responsibilities. Sometimes expanded roles for lower level staff will allow more flexible staffing of units, to the extent that regulation permits. Sometimes it is possible to combine tasks to form a new, enlarged, module of work. Using multidisciplinary teams can break down departmental barriers to allow enlarged spheres of responsibility for individual staff. Many new configurations of tasks and staff are possible, but must be proceeded by an investment in human resource staff to engage in the necessary fundamental analyses and rethinking of tasks.

A familiar industrial response to manpower shortages or perceptions of overly-high personnel expenses, is to try to improve labor productivity. However, there is a common perception that the service sector of the economy has very low rates of productivity growth (Kutcher and Mark, 1983) and that health care, because it requires a hands-on, one-on-one approach, is not amenable to measures to increase productivity. Certainly, if operating margins continue to deteriorate, it seems reasonable to expect administrators to seek ways of improving productivity. If health care is viewed not as a whole, but rather as individual specific services, some areas appear to have potential for productivity gain. One of the often cited areas is automation in laboratories.

Today's financial incentives to reduce cost are expected to encourage the development and adoption of technologies that improve productivity. Some structural changes in the way health care is delivered also have potential for productivity improvement. For instance, large-scalespecialized delivery sites, such as special surgery or imaging units, may be able to reap economies of scale in the use of personnel. However, it is unlikely that changes such as these will outweigh other changes--such as the move to home services, and the new, complex technologies--that use manpower in a less productive manner.

Cross-trained or multi-competent allied health personnel are concepts that have been discussed for many years. In the past the context was rural health staffing problems. Today they are seen by some as innovative solutions to shortages of personnel, especially in small hospitals, physician offices and other small delivery units. Multi-competent personnel are also regarded by some larger hospitals as economical sources of staffing needed 24 hours a day but with low-use periods. More generally, as revenue restrictions force administrators to examine ways of controlling labor expenses, employers are becoming interested in increasing labor productivity by decreasing specialization, as evidenced by the American Hospital Association sponsoring a number of workshops on the multi-skilled concept. A 1986 national survey of medical laboratory managers indicated that 46.3 percent said that they could use cross-trained personnel (Watrous, 1987). A survey of hospital administrators, directors of nursing, directors of community health organizations, and physicians in Philadelphia showed that multicompetent practitioners are already employed in approximately a quarter of the hospitals. Sixty percent of the hospital administrators were willing to have multicompetent practitioners now (Low and Weisbord, 1987), and educators report that their multicompetant graduates generally find jobs that use their training (Blayney, 1982). Using multi-competant practitioners is not an all-purpose solution, but it represents the results of an effort to think through the tasks that must be performed, and how the education system can respond.

Productivity improvements, however achieved, are defined as decreasing the input per unit of output. Thus we say that productivity is increased if a laboratory worker increases the number of tests performed per hour. Another way of thinking about how best to use allied health manpower and improve productivity is to redefine output in terms of contribution to patient care. To make this definition operational, one must evaluate effectiveness. Output can be increased, and pressures on manpower supply can be relieved by reducing services that fail to contribute to patient welfare.

Suggestions of unnecessary care (or at least lack of agreement about appropriate care) are found in studies showing variations in amounts of service among nations, among regions in the same country, and among different types of organizations. But the identification of effective and ineffective care by allied health practitioners is not plentiful. Shroeder (1987) reports studies that have detected patterns of overuse. Overused procedures or technologies, according to these studies, include white blood cell differential counts, measurement of serum lactic dehydrogenase, blood cross match, barium enema studies, upper gastrointestinal series, nursing service orders, tonsillectomy, chest x-rays, prescription drugs, preoperative screening tests, and thyroid function tests. Shroeder adds,

> A recent study from our institution estimated the proportion of redundancy among a wide variety of diagnostic and nursing services for patients on a general medical ward. Of the more than 8,000 services ordered for 173 patients during the observation period, 21% were judged to be unnecessary by faculty auditors who reviewed the medical records. The most overused services were partial thromboplastin time (deemed unnecessary in 63% of uses), stat/emergency orders (43%), nuclear medicine studies (26%) and platelet counts (25%).
>
> Another way of assessing overutilization is by determining whether clinical services contribute to patient management. Reports from several teaching institutions and one community hospital show that as few as 3% to 5% of diagnostic tests are actually used in the management of the patients for whom they are ordered (Shroeder, 1987).

Probably the allied health service most studied for over-utilization is the clinical laboratory. One analyst suggests that ensuring effectiveness is in part the responsibility of laboratory scientists who should ask a number of questions such as is the ordered tests is appropriate for the patient's clinical condition? What level of accuracy and precision is needed for clinical judgment (Barr, 1987)? Others are working to develop methods for detecting overutilization (see for example, Eisenberg, 1982 and Garg et al., 1985).

Many questions about effectiveness remain unanswered today. If cost containment pressures continue to mount, some employing organizations may initiate research. HMOs may shift their focus from a concentration of reducing hospitalization to reducing ineffective care in other areas. Other prospectively paid providers too have reason to try to eliminate excess services.

Finally, some allied health practitioners may want to undertake effectiveness research to affirm their place in patient care. Until that is done they may be vulnerable to cuts by institutions seeking to reduce personnel expenses.

Employers With Special Problems

Some health care providers are particularly disadvantaged in the competition for allied health practitioners. These employers will find that for one reason or another they cannot implement many of the strategies discussed earlier in this chapter. In this section we will discuss the predicaments of two of these employers—rural health care facilities and nursing homes and other long-term care sites. We will suggest some strategies that may be useful in trying to cope with their needs for allied health manpower.

Rural Health Facilities

According to the U.S. Bureau of the Census, over a quarter of the population of the United States is in rural areas. These people live in areas that differ from other parts of the nation in many aspects, and often these differences have implications for the delivery of health care.

The definitional and not unimportant difference is that rural areas are more sparsely populated than urban localities. Fewer people live in the catchment area of a rural health care provider. The population is more often poor (14 percent below the poverty level compared with 11 percent in metropolitan areas in 1981) and elderly (13 percent over 65 compared with 10.7 percent in 1980), and therefore has differences in health status and health care needs. Examples of health status differences include higher rural infant mortality, higher incidence of hypertension, coronary heart disease, emphysema, and some other chronic conditions, but lower incidence of acute conditions as a whole (Cordes and Wright, 1985).

Some of these differences may relate to differences in health care services available to rural populations. The hospital-bed-to-population ratio does not differ much between rural and nonrural areas, thanks to the Hill Burton Act of 1946. But the supply of health professionals in relation to population is less in rural areas and so is the range of services offered by hospitals (Cordes and Wright, 1985).

That these rural hospitals have special problems is well documented. Of the 5,732 community hospitals in the United States in 1986, 47 percent were rural and 17 percent had fewer than 50 beds. Eighty percent of small hospitals are rural. Small hospitals anywhere are more likely to close than larger hospitals. Of the 214 community hospitals that closed between 1980 and 1985, 75 percent had fewer than 50 beds; 86 were rural and 128 urban. (Health Resources and Services Administration, 1987).

The reasons for the vulnerability of rural hospitals may relate not only to their rural characteristics, but also to smallness. Analyses of American Hospital Association data (Table 6.3) show that between 1980 and 1986, the smaller the hospital the greater the deterioration in several key indicators of strength. Operating margins, admissions, and occupancy have fallen more and are lower in smaller hospitals. These data tell why raising salaries to attract allied health practitioners is not feasible for many small rural hospitals.

Attracting practitioners to rural employment is more difficult than to other settings. Table 6.4 contrasts the practitioners to population ratios in metropolitan and non-metropolitan settings for some allied health professions. It is evident that metropolitan areas in 1980 had a more plentiful supply of practitioners in all the listed fields. This lower rural concentration may in part be due to the lower concentration in rural areas of some of the individuals and organizations that usually employ allied health practitioners—dentists, physicians, and so on. But with the hospital-bed-to-population ratio quite similar in rural and nonrural areas, the usual employers of the majority of allied health practitioners would seem to be present.

TABLE 6.3: Selected Indicators of Hospital Strength

	Percent Change 1980-1986	Actual 1986
Operating Margin:		
all hospitals	1.0	5.4%
hospitals with 25-49 beds	-4.8	1.5%
hospitals with less than 25 beds	-4.5	-6.3%
Admissions:		
all hospitals	-8.0	
hospitals with 25-49 beds	-39.8	
hospitals with less than 25 beds	-44.8	
Occupancy:		
all hospitals	-16.1	63.2%
hospitals with 25-49 beds	-36.7	33.2%
hospitals with less than 25 beds	-31.7	27.4%

SOURCE: Health Resources and Service Administration, 1987. Rural Hospitals/Health Services. Unpublished.

For rural hospitals allied health employment problems can be viewed in three ways. One is problems in attracting practitioners to rural employment. The second is affording the practitioners. The third is finding practitioners with the education that suits them for rural employment.

TABLE 6.4: Geographic Distribution of Selected Allied Health Professions, 1980

Allied Health Profession	Number per 100,000 population		Non-metro ratio as percent of metro ratio
	Non-metro	Metro	
Dietitian	26.0	30.9	84
Speech therapist	14.4	19.5	74
Health aide, except nursing	99.9	138.5	72
Inhalation therapist	16.6	23.1	72
Dental assistant	53.2	75.2	71
Health record technician	5.0	7.2	69
Radiologic technician	31.0	46.3	67
Physical therapist	12.7	21.1	60
Clinical laboratory technician	68.9	120.5	57
Dental hygienist	12.3	23.1	53
Occupational therapist	3.5	9.3	38

SOURCE: Review of Allied Health Education: 5, Ed. Joseph Hamburg, University Press of Kentucky, 1985.

The geographical maldistribution of personnel in some health care fields has been well studied. Less work has focused on the maldistribution of allied health practitioners. Some lessons can be drawn from what is known about other types of health care practitioners. Allied health education, like most health care education, takes place primarily in metropolitan areas. Most often clinical experience is provided in acute care settings with the patient volume needed to support state-of-the-art, high technology services. Graduates are subsequently drawn to employment in similar settings for several reasons. They perceive these settings as offering high quality care, personal challenge, full use of their education, and the stimulation of contact with peers and supervisors. By contrast, to a city-reared worker, rural facilities are an unknown setting, perceived as isolated, backward in terms of technology and with little room for advancement in their field. One lesson from studies of health personnel education and employment decisions is that graduates who grew up in rural areas or whose education included experience in these areas are more likely to chose rural employment.

Individuals whose roots are in rural areas can find the monetary and psychological cost of attending education programs in metropolitan areas prohibitive. Taking education to rural areas would help bring these individuals into the allied health workforce. Such techniques include the use of telecommunications technologies and "circuit riding" faculty. Employers could assist such efforts by encouraging qualified allied health staff to participate in teaching. They could also provide classroom space and clinical experience in their facilities.

The employer's role in increasing the supply of graduates familiar with rural settings is thus twofold. First, to work with local high schools and career counsellors to encourage students to pursue allied health careers. Second, to work with allied health educators to provide clinical experience in their facilities. In Alabama a consortium of junior colleges and the University of Alabama was formed in 1969 to enhance the supply of allied health practitioners in underserved areas. As described by Keith Blayney, Dean of the School of Community and Allied Health at the University of Alabama:

> In 1969, the state's junior college presidents and representatives of the University of Alabama in Birmingham (UAB) met and endorsed the concept of a consortium to link the two-year schools with UAB. The benefits were readily apparent—by sharing students with the Regional Technical Institute (RTI) at UAB, the duplication of specific allied health programs and their high costs could be avoided. Also, students could attend school near their homes for the first year of the program. After the second year at RTI, graduates were likely to return to their homes, located in the medically underserved areas of the state, and provide ancillary support for medical services there. As the program developed, efforts were made to establish clinical training sites for the students in or near their homes, thus providing an additional impetus to return home.
>
> Before their year of technical training at the RTI ends, the students spend six to eight weeks in on-site clinical training. Although the RTI is located in the heart of UAB's Medical Center, where there is a large volume and variety of clinical materials, it soon became clear that the Medical Center alone would not be sufficient to provide adequate experience for all the allied health students. As a result, linkage students can now complete the last weeks of their clinical training at smaller health care facilities throughout the state. These facilities range from doctors' offices to nursing homes, clinics, and hospitals. This arrangement has other advantages. The students can work close to their homes, in facilities similar in size and scope to those in which they will probably work. Also, upon graduation, the students are often offered positions at the facilities where they did their training.

Since the number of clinical facilities has been expanded, a higher percentage of RTI graudates have returned to rural areas to work. In 1977, 59% of graduates of programs that have clinical training sites outside of Birmingham took jobs outside of the city, while only 34% of the graduates who had no clinical affiliation outside Birmingham left the city (Blayney, 1981).

An evaluation of the linkage program after 11 years found that 66 percent of the graduates who remained in allied health returned to their home county to work (Cooper, 1982). Clearly this model requires serious commitment by employers and leaders in education institutions concerned with and willing to help resolve some problems of rural care.

Another type of linkage would be for rural employers to arrange regular, periodic secondment to an urban facility for their allied health employees. Arrangements with educational programs and leaders in allied health fields to provide lectures or seminars to practitioners in rural areas might also help dispel some fears of isolation and ensure that practitioners are kept up to date in their field—as would generous allowances for continuing education.

Rural employers operating low volume facilities that cannot afford or fully use a full-time staffer can also try to develop linkages. In Wisconsin 22 small rural hospitals have formed a cooperative that shares services, mobile technologies, and professional staff, who travel among hospitals (Health Resources and Services Administration, 1987). Employer initiated sharing (as opposed to employees who find several part-time jobs) may also appeal to practitioners because they get full-time employment and benefits that are often not offered to part-time employees.

A further model of cooperation among employers is the organization of services on a regional basis with each hospital specializing in certain services. The Robert Wood Johnson Foundation is offering grants for this and other models to help rural health providers with financial problems.

The notion of multicompetent personnel is frequently suggested as a solution for low-volume rural providers. A small number of programs training multicompetent practitioners exists. A program providing dual certification at Southern Illinois University at Carbondale, started in the 1970s, is popular with rural communities. Recently, however, students have sought certification in only one field. This is thought to be because single field jobs pay better (Cordes and Wright, 1985). As we have noted, the ability to pay competitive salaries is likely to be limited in rural locations and is dependent on reimbursement decisions. But absent attractive compensation, efforts to ease rural manpower problems will fail in the long run.

Employers desiring multicompetent practitioners can help by ensuring that educators know that demand exists, and also making known the mix of competencies they need. If an individual's education is tailored to an employer's requirements the employer can use the practitioner efficiently, and thus maximize salaries.

The third type of problem of rural health providers--finding allied health personnel with the special skills needed for employment in small rural settings—can also be alleviated by linkage with educational programs. Again, providing clinical sites for students ensures that they learn rural practice. Models already exist. We have mentioned the University of Alabama's Linkage Program. The University of Wisconsin Medical Technology Program places students in a generalist capacity in small hospital laboratories. This program is said to have contributed significantly to the interest of the student in clinical laboratories in community and rural hospitals as the majority of students have been employed in such laboratories after graduation (Bamberg, 1981). Another model offers students experience on health care teams in rural Kentucky. Students at Kentucky Southern Community College are exposed to rural practice and learn how to function with others on the health profession team (Bamberg, 1981).

One type of linkage already in place for some rural providers is membership in a multiprovider organization. Regardless of whether this organization is horizontally or vertically integrated, if both rural and urban sites belong, an opportunity for innovative solutions to staffing problems exists. Rural members of the organization might negotiate arrangements whereby service at, or rotation through, a rural location becomes a necessary step in the upward career ladder of the organization.

Long-Term Care Facilities

Long-term care providers (such as nursing homes and chronic mental care facilities), similarly as rural health care providers, have special characteristics that make some of the strategies suggested in the earlier part of this chapter inapplicable. It is difficult to increase salaries to attract allied health practitioners when reimbursement is extremely tight. It is often impossible to provide paths to advancement in small facilities, which describes many nursing homes.

Chapter 8 explores reasons why long-term care facilities are not seen as attractive worksites. Some of the reasons are subjective and perceptual. The care of elderly patients, and those with chronic and mental diseases is seen as unsatisfactory compared with working with patients in whom real and lasting improvement can be realized. Mental disturbances of patients make practitioners' tasks more difficult and are a condition for which education often fails to prepare them. In the course of this study the committee uncovered concern among the providers of long-term care that educators and practitioners in many allied health fields are both unwilling and unprepared for work with elderly patients and chronic conditions. Remarks like the following were often heard: "Physical therapists would rather work in sports medicine and with the acute phase of trauma rehabilitation than with frail, confused, nursing home patients." Long-term care facilities in some regions are not perceived as giving high quality, or sometimes even adequate care. Clearly a long-term, major effort is needed to change perceptions of work in the chronic care sector. The figures in Table 6.5 suggest that for dietitians working part time, and for full- and part-time occupational and physical therapists, compensation is not likely to be a decisive factor in choosing between employment in a nursing and personal care facility and employment in a hospital. Job satisfaction, however, may be greater in acute care settings.

Lower-level personnel—nursing aides and orderlies—have fewer opportunities in the acute care sector. But, for these individuals the average hourly salary of $5.15 for nursing aides in nursing and personal care facilities might not be competitive with alternative employment in such places as fast-food restaurants which pay more and for which no formal post-secondary education is needed and working conditions are less stressful (Kerschner, 1987).

Long-term care employers can try to utilize some of the options suggested in the earlier section for rural health employers. Establishing links with allied health education programs to increase curricula content relating to long-term care could help deflect some anxieties about serving these special populations. Similarly providing clinical sites for students can dispel misconceptions about the work, enhance skills needed to serve in long-term care and establish ties with an employer.

An Institute of Medicine committee in 1983 recommended that education programs for nursing should provide more formal instruction and clinical experience in geriatrics. It was believed that this would augment the supply of new nurses interested in caring for the elderly (Institute of Medicine, 1983). For allied health practitioners too, this could be an effective strategy. and is further discussed in Chapter 8.

Conclusion and Recommendations

Human resources planning has not been a high priority nor an integral part of strategic planning in the health care organization. Because of this there has been little emphasis on or investment in research and experimentation in structuring staffing policies and working environments. Moreover, when there is a plentiful manpower

TABLE 6.5: Average Hourly Earnings in Hospitals and Nursing and Personal Care Facilities, 1985

Occupation	Hospital	Nursing and Personal Care Facility	Percent Difference
Full-Time			
Dietitian	$ 11.52	$ 10.69	-7.2
Occupational Therapist	11.41	11.11	-2.6
Physical Therapist	11.98	13.25	10.6
Head Nurse	14.37	12.40	-13.7
Part-Time			
Dietitian	11.66	11.60	-0.5
Occupational Therapist	11.78	11.32	-3.9
Physical Therapist	12.71	15.63	23.0
Head Nurse	14.84	11.58	-22.0

SOURCE: Bureau of Labor Statistics, Industry Wage Surveys, 1985.

supply there is little incentive to undertake such an onerous task. However, the committee foresees that the availability of alternative employment and stable or falling enrollments in allied health education programs will find some employers—particularly hospitals—unprepared to solve difficulties in staffing and fulfilling service demands. Relying on the government to create incentives, such as education subsidies for entry into professions that turn out to be poor careers, and complaining about licensing barriers are not likely to be as effective a solution as an investment in improved management capability. Except in the face of appreciably lower operating margins, it will be difficult for administrators to make a convincing case for increased reimbursement (through the prospective payment system (PPS), for example) to help support salary increases without having demonstrated to payers that management solutions have been pursued to their practical limits. To date employers have relied on new graduates and short-term incentives to offset turnover and prolong tenure in the workforce.

The committee recommends:

Employers should strive to increase the supply of allied health practitioners by attracting people into allied health and prolonging their attachment to their fields. Some ways include increasing compensation, developing mechanisms for retention, and establishing flexible schedules and educational opportunities. Employers also should look to new labor pools that include men, minorities, career changers, and individuals with handicapping conditions.

However, attracting and keeping individuals in allied health is only one part of a strategy to relieve pressures. The committee recommends:

Chief executive officers, human resource directors, and other health care administrators should develop methods of effective utilization of the existing supply of allied health personnel. Such methods must grow out of experimentation with new ways of efficiently organizing the work and distributing labor among skill levels while ensuring that quality of care is not compromised.

As the health industry looks more aggressively beyond cost-savings through reduced hospital utilization toward technology assessment, quality assurance, and nonhospital utilization controls, it is appropriate that allied health services come under scrutiny. This should be viewed by management as an opportunity to work with allied health to use a scarce labor resource effectively. It is also an opportunity for allied health to help provide the research underpinning that will be the foundation for decision-making.

The committee recommends:

Health care providers and administrators should seek innovative ways to channel limited allied health resources to activities of proven benefit to consumers. Agencies such as the National Center for Health Services

Research and the Health Care Financing Administration should sponsor research and technology assessment to ensure that allied health services are both effective and organized efficiently. Associations, unions, accrediting agencies, and professional associations should assist in disseminating research findings and providing technical assistance for their implementation.

If employers are to use limited human resources in an effective manner, personnel must be appropriately educated. In addition, the goals and aspirations of new graduates should accord with the realities of life in the workplace, otherwise their job satisfaction is likely to be undermined. The committee therefore strongly recommends the following:

Health care administrators and academic administrators should engage in constructive exchanges about the congruence of employment and education. These exchanges, which should take place at the state and local level, will be enhanced by the participation of educators who are also leaders of the professional associations.

Although the analyses in this study are most often based on national data, the committee emphasizes that conditions differ among states, and even among localities. State legislators have a legitimate interest in assuring an adequate supply of health care personnel, educational opportunities for the states' citizens, and employment opportunities for graduates of state supported education programs. The committee recommends that:

State legislative bodies should establish special committees or subcommittees of standing committees whose primary purpose would be to address state and local issues in the education and employment of allied health personnel.

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Chapter 7

LICENSURE AND OTHER MECHANISMS FOR REGULATING ALLIED HEALTH PERSONNEL

The congressional charge to this committee directs it to "investigate current practices under which each type of allied health personnel obtains licenses, credentials, and accreditation" (Section 223(b)(3)). The committee has taken a rather broad view of this charge, interpreting it to be directed toward the concern of Congress and society for the whole array of mechanisms meant to assure that allied health personnel are properly trained and competent to practice. These mechanisms, which encompass licensure and other forms of governmental regulation, voluntary certification, and standards imposed by health care providers and payers, are central to this study in that they interact with and influence virtually all the other study issues.

For example, the scope of practice defined under state licensing statutes and regulations affects the demand for allied health personnel by constraining how they may be utilized by employers. Certification, if accepted as a valid distinction by employers or if required by accrediting bodies such as Joint Commission on Accreditation of Healthcare Organizations (JCAHO), also affects employers' decisions to employ allied health personnel; certified and non-certified members of the same allied health field then are treated as separate labor pools. Regulatory mechanisms also influence supply by defining who may enter, and remain in, certain allied health fields.

A great deal is at stake here. Health care payers rely on licensure and other credentialing mechanisms to assist them in defining eligibility for coverage and reimbursement for the services of allied health personnel. The various allied health occupations look to these mechanisms to give them identity and legitimacy by defining the nature and length of training, other requirements for entry to the field, and the power to control certain health care practices.

In a time of great ferment in health care, these control mechanisms take on even greater significance. The proliferation of health occupations, changing models of health care delivery, and new reimbursement methods, along with cost-control efforts by industry and government, place stresses on these controls.

In carrying out this part of the congressional charge, the committee has held discussions with officials of government agencies and private organizations responsible for the various control mechanisms. It also held a public hearing at which testimony was heard from 26 allied health associations and four other experts, two of whom prepared papers for the committee on state regulation of health occupations. Also, the committee reviewed the research literature on occupational regulation.

Methods of Control

State regulation

Society applies many quality control methods to health care personnel, including allied health personnel. The states bear the greater responsibility in this. Through occupational licensure and other forms of regulation, states exercise their authority to protect the health, safety, and welfare of their citizens. The earliest attempts to regulate health occupations in this country were in colonial Virginia (1639), Massachusetts (1649), and New York (1665), when medical practice acts were enacted. By the turn of the century, the Supreme Court had validated this use of the states' police powers and most states had licensed lawyers, dentists, pharmacists, physicians, and teachers. Between 1900 and 1919, according to a background paper prepared for this committee, nurses, optometrists, osteopaths, podiatrists, and veterinarians also were licensed in most states (Carpenter, 1987). Before 1960 this list had expanded to include dental hygienists, practical nurses, and physical therapists. Since 1960, only three health occupations have come to be universally licensed: psychology, nursing home administration, and emergency medical technology. The latter two are licensed as the result of federal legislation.

Table 7.1 shows the licensure status of the 10 allied health fields on which this study has concentrated. Among these fields, physical therapists and dental hygienists are licensed in every state. Emergency medical technicians must be certified by some agency in every state. At the other extreme is the field of medical records administration, in which no state requires licensure; this field relies instead on certification (registration) by the American Medical Records Association. All the other fields are licensed in some states: respiratory therapists in as few as seven states, audiologists and speech-language pathologists in thirty-seven.

Licensure is the most restrictive form of state regulation. Carpenter (1987) defines licensure as "a process by which a governmental agency restricts entry into an occupation by defining a set of functions and activities constituting a 'scope of practice', grants permission to engage in that practice only to persons meeting predetermined qualifications, and establishes structures and procedures for screening applicants and granting licenses to practice." These and other definitions share certain common elements, including:

- licensure is intended to protect the public
- licensure is exclusionary
- licensure prescribes the characteristics and qualifications of persons who may be licensed
- licensure defines a scope of practice for licensees (and therefore licensure laws are often referred to as "practice acts")
- licensure prohibits non-licensed persons from engaging in the defined scope of practice.

Although the standard definitions focus on initial entry, licensure also addresses standards of practice and ethical and business behavior (what it takes to keep a license), and on causes for disciplinary action (what it takes to lose a license).

By long tradition, licensure has been, for all practical purposes, a form of state-sponsored self-regulation, since it has been carried out by boards composed of members of the regulated occupation empowered to act with a high degree of autonomy. As Shimberg (1984) noted in recounting the history of state licensure:

> These boards had broad powers to implement the law by promulgating rules and regulations governing practice standards and professional conduct; establishing minimum education, training, and experience qualifications; examining candidates as to their fitness to practice; investigating complaints against practitioners; and taking appropriate disciplinary action, including suspension or revocation of a practitioner's license where appropriate.

Recent reforms have broadened the membership to include representatives of the public who may or may not have voting privileges. But, on the whole, the licensed occupations still are largely self-regulated. This point is elaborated below in the discussion of problems and recent reforms. However, licensure carries with it a whole array of regulations and administrative procedures for implementing the state statutes.

TABLE 7.1: Licensure Status of Selected Allied Health Fields

Field	Status
Clinical Laboratory Technology	Medical technologists are licensed in 5 states and New York City. Technicians are not licensed in any state.
Dental Hygiene	Dental hygienists are licensed in all states and the District of Columbia. Dental assistants are not licensed in any state.
Dietetics	Dieticians are licensed in 14 states, the District of Columbia, and Puerto Rico
Emergency Medical Services	Certified in all states
Medical Record Services	Neither medical record administrators nor medical record technicians are licensed by any state.
Occupational Therapy	Occupational therapists are licensed in 34 states, the District of Columbia, and Puerto Rico. Occupational therapy assistants are not regulated by any state.
Physical Therapy	Physical therapists are licensed in all states. Physical therapy assistants are licensed in 18 states.
Radiology	Radiographers are licensed in 17 states and Puerto Rico. Radiation therapy technologists are licensed in 15 states and Puerto Rico. Nuclear medicine technologists are licensed in 10 states and Puerto Rico.
Respiratory Therapy	Respiratory therapists are licensed in 7 states.
Speech-Language-Pathology/Audiology	Speech-language pathologists and audiologists are licensed in 36 states and Puerto Rico.

SOURCE: McTernan, E. J. et al. 1987. Allied Health Progressions in the United States: A Summary of Origins, Development and Potential Futures of a Selected Sample of Allied Health Fields. Background paper prepared for the Institute of Medicine Committee to Study the Role of All Personnel. Testitmony of some allied health professional organizations, presented to the committee during a public meeting. July, 1987

States can and do employ a number of modes of occupational regulation other than licensure. A taxonomy of the different modes appears as Table 7.2. Among our 10 fields, title protection through registration or certification by the state is the most frequently employed form of regulation other than licensure. This regulatory mechanism is also applied in other fields such as accountancy, where anyone can practice in the field but only those who have met state standards can use the title "Certified Public Accountant." In one form or another, about 800 occupations are regulated by the states, including architects, real estate brokers, barbers and cosmetologists, electricians, and engineers.

Beside occupational regulation, states also regulate allied health personnel through the regulation of institutions and settings where they work. The requirements for licensure of hospitals and nursing homes include standards for personnel. States have other laws and regulations of broad applicability in place, such as those that govern business practices and provide consumer protection, which may be used against incompetent or unscrupulous allied health personnel. The states also define qualifications for civil service positions held by these personnel.

Consumers may utilize the tort system in any state to file civil suits to seek compensation for malpractice by allied health personnel. Presumably this mechanism carries some deterrent effect; however, in the context of quality assurance it must be viewed as a last resort.

Criticisms of State regulation Occupational regulation has been in ferment for at least 20 years. Criticisms have come from a number of quarters, and these criticisms have given rise to recommendations for reform. Some changes have taken place as a consequence.

In the 1960s, the source of concern was health care access. With an apparent shortage of physicians, there was concern that restrictive licensing laws were hampering the effective deployment and utilization of physician assistants and other physician extenders. This issue was addressed by the National Advisory Commission on Health Manpower in its 1967 report. At the direction of Congress in the Health Training Improvement Act of 1970, the Department of Health, Education, and Welfare investigated problems in licensure and certification of health personnel. The Department's 1971 Report on Licensure and Related Health Personnel Credentialing contained far-reaching recommendations, including a recommendation to the states for "a two-year moratorium on the enactment of legislation that would establish new categories of health personnel with statutorily-defined scopes of functions." The moratorium was to allow time for further consideration of the tasks and functions of new health occupations.

TABLE 7.2: Modes of Occupational Regulation

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1. Practice Standards

Without special enforcement

Through the adoption of statutes and rules, this mode can establish restrictions on the practice of an occupation with civil or criminal penalties enforceable through the courts. This type of regulation requires no inspections, registration or special enforcement staff. Rather it relies on action by the harmed parties or by a consumer affairs office.

With special enforcement

Through statutes and/or rules, this mode can establish restrictions on the practice of an occupation in addition to establishing inspection, enforcement mechanisms and penalties. However, this mode does not require registration, certification, or any assessment of the practitioner's credentials or competency.

2. Registration

Without standards

Through regulation, a state agency can require persons in an occupation to register and supply certain information without requiring any standards, testing or enforcement.

With standards

It is also possible to have a registration requirement in combination with minimum practice standards set by a designated agency. While registration would not be exclusionary, it would subject registrants to minimum standards and thereby provide some protection to the public.

3. Statutory Certification

With state standards and state enforcement

Through regulation, occupational members can be required to meet certain state standards; only those who meet these predetermined qualifications may legally use the designated title of the occupation. This mode entails standards, testing, codes of practice, possible inspections, and enforcement.

With private standards and assessment and state enforcement

Through regulation, an agency of the state may require members of an occupational group to meet certain standards established by a private testing or assessment center or organization (reviewed by the state), with the state handling the certification and any enforcement required. Legally, the state is responsible for the standards set and for monitoring the process.

continues...

TABLE 7.2, continued: Modes of Occupational Regulation

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4. Statutory Certification and Practice Standards

A state may establish by rule certification for an occupation and also request the legislature to pass a law which would establish practice standards for that same occupation. This combination would establish a system of title control for those meeting certain required standards of competency, as well as establishing standards of practice for anyone who practices the occupation.

5. Regulation through Supervision by an Already Licensed Practitioner

Certification with standards

Through statute and rule, an occupation can be certified and required to work under the supervision of an already licensed occupation; standards for practice can also be established.

Through standards of practice but without certification

It is also possible to regulate by providing that the occupation be performed under the supervision of a licensed profession with certain standards set forth but without requiring that the individual be certified.

6. Licensure

Licensure represents the most restrictive form of occupational regulation providing for both title control and an exclusive area of practice. It requires standards of practice, education, knowledge and/or minimum competency, inspection and enforcement with civil and criminal penalties.

SOURCE: Sybil K. Goldman and W. David Helms, "The Regulation of the Health Professions." A policy review prepared for the Commission of Health Regulatory Boards of the Commonwealth of Virginia, October 1983.

Questions about the wisdom of occupational licensure have persisted to the present, although circumstances are different. The perceived shortage of doctors and dentists has changed to a perceived surplus, and the number of newly-emerging health occupations is increasing. Since the early 1970s, the issue of rising health care costs has taken on greater and greater importance. In the context of cost containment, the fact that more and more health occupations have been seeking statutorily protected scopes of practice is worrisome. This proliferation is seen as contributing to inefficiencies in the health care industry, especially so in view of the rapidity of technological change.

Allied health personnel are affected by this tension. Many of these fields are new, and, according to the example offered by older, well-established fields such as medicine, nursing, and dentistry, state licensure is crucial to their achieving recognition as professions. Licensure, it is believed, gives legal validation to the field's unique status. It provides a way of excluding unqualified practitioners from providing services, it gives official recognition to the field's scope of practice, and it offers easily verified credentials that can be used by employers and health care payers (McCready, 1982). Licensure also is considered necessary to avoid being subject to prosecution for practicing medicine without a license, since many medical practice acts are so broad that physicians are granted virtually unlimited scopes of practice.

Above all, state regulation is viewed as a means of improving the quality of health care by restricting entry to persons who have proper credentials and by disciplining persons who do not meet standards of professional behavior. Much of the criticism leveled at regulation is based on the lack of evidence on this point.

Criticisms as to Structure and Process The traditional regulatory structures and processes, developed in the last century, are criticised as anachronistic and inconsistent with their central public policy significance.

By long tradition, the regulation of a health occupation, given a practice statute, is the responsibility of a board. The composition of the board is usually defined in the statute. One of the strongest criticisms of the regulatory structure is that these boards are not sufficiently accountable to the larger public. Until recently, they were composed entirely of members of the regulated occupation, drawn from the membership of their related associations. In many states they generated their own revenues by charging fees to candidates and licensees; they had their own staffs; they often were located in the home of the board secretary; they had considerable rulemaking authority with little or no oversight. Their proceedings were closed to the public, as were their records.

By statute, the regulatory boards are charged with setting entry requirements; with setting practice standards and codes of conduct; and with disciplining licensees who fail to meet those standards and codes. The performance of these functions also has been subject to criticism.

Eligibility standards are defined in terms of education and, in some cases, experience. Boards also require entrants to pass an examination. The exam in some cases is devised by the board. In others, the board relies on a national examination or commissions a testing organization to develop a state exam. Criticisms leveled at entry requirements are that they are inflexible, offering only one path to entry; that education and experience requirements are unrelated to the demands of practice; that educational requirements rest heavily on accreditation, which in turn is controlled by the professional associations; that examinations are not valid reflections of real-world practice requirements; and that the common practice of "grandfathering" current practitioners when licensing a new occupation is inconsistent with the goal protecting the public health and welfare.

"Standards of practice" are defined in terms of behaviors that are subject to disciplinary action, including fraud and deception in obtaining the license; conviction of a felony; engaging in unacceptable patient care through deliberate or negligent acts; knowing violation of the practice act; continuing to practice although unfit; and lewd or immoral conduct in the delivery of services. "Codes of conduct" most commonly prohibit business practices that are considered unacceptable professional behavior. Traditionally, these have included advertising; practice in chain or department stores, shopping centers, or other "commercial" environments; and engaging in competitive bidding.

Disciplinary procedures are usually defined in the statute. In some states and for some occupations, revocation of the license is the only sanction provided. In others, an array of sanctions of varying degree are provided for including license suspension, censure, and reprimand.

Boards have been criticised for the way they carry out their disciplinary responsibilities. They only investigate complaints of incompetence or impropriety rather than doing any independent monitoring. Impropriety (that is, violation of the code of ethics) is more frequently the basis for disciplinary action than is incompetence. The number of disciplinary actions is extremely low in comparison with estimates of the incidence of incompetent practice. The public is not informed of disciplinary actions against licensees. A partial explanation for the historical lack of disciplinary vigor is the inadequacy of resources available to the task of investigating and "prosecuting" complaints. Without sufficient staff and budget, as Shimberg has observed, the regulatory process is more bark than bite.

"Turf" monitoring and turf protection occupy a significant portion of the energies of a state's regulatory apparatus. The various occupations are battling among themselves as to which pieces of health care and which pieces of the patient they have jurisdiction over. These battles are fought through establishing practice acts and implementing rules and regulations. This is not the only theater; insurance coverage and reimbursement is another. But the regulatory arena is where the identity and power of allied health personnel is largely determined.

In carrying out the study the committee encountered many examples of jurisdictional struggles among allied health and other occupations, struggles that cause their roles to be constantly shifting. For instance,

— ophthalmic medical assistants versus optometrists on performing refractions

— surgical technologists versus nurses on who should perform various tasks in the operating room

— orthotists versus physical therapists on fitting braces and other orthotic devices

— audiologists versus hearing aid dispensers in hearing testing.

These struggles, in which occupations seek to expand their realm of control at the expense of others, are a constant element of regulating health occupations through licensure. In many cases, the issue is which occupation is entitled to perform specific functions. In others, the issue is which occupation or occupations have jurisdiction over some portion of the human anatomy. In still others, the issue is under what conditions persons in the occupation perform their functions. For example, in many states physician referral is required for physical therapy or occupational therapy, but not for speech therapy. Another important condition of practice is the level of supervision required. These referral and supervision provisions in licensure statutes define the degree of autonomy of health care workers on the one hand and their degree of availability to consumers on the other. Decisions on these issues by state legislators and regulatory bureaucracies affect the costs, quality, and accessibility of health services in their states.

The great difficulty facing state decisionmakers is that the impact on costs, quality, and accessbility of any proposed modification in a health occupation's scope of practice, referral, or supervision is rarely clear. The risks and benefits of change often are hypothetical, difficult to measure, and subject to large differences in judgment. Rhetoric and political power frequently substitute for evidence and rational decision-making. Rarely are there rigorously done studies.

One of the clearest examples of this problem is the case of dental hygiene services. In the course of testimony by representatives of the American Dental Hygienists' Association and the American Dental Association at the committee's July 1, 1987 public hearing, committee members learned of the continuing controversy over the required levels of supervision of dental hygienists by dentists.

In general, dental hygienists are only permitted to practice (that is, perform a variety of chiefly preventive services such as cleaning teeth, taking x-rays, applying topical fluorides, and teaching proper dental hygiene) under the supervision of a licensed dentist. The supervision may be "general", which means that a dentist may delegate a given function. The dentist must be responsible for its successful performance but does not have to be physically present while the delegated function is carried out. Alternatively the supervision may be "direct", meaning that the dentist must be present in the same room as the hygienist, or "indirect", which requires only that the dentist be present in the treatment facility.

Supervision requirements vary among the states. According to the American Dental Hygienists' Association, 38 states permit dental hygienists to practice at least some preventive oral health services under general supervision. In some states, general supervision is limited to hospitals, nursing homes, adult day care centers, and other institutional settings. (American Dental Hygienists' Association, 1987a) In the state of Washington, dental hygienists have practiced unsupervised in long-term care facilities since 1984.

The American Dental Association is seeking to tighten supervisory requirements for hygienists. In 1986, the ADA House of Delegates passed a resolution opposing general supervision and urging state dental societies to eliminate it from state practice acts. The same resolution urged that, in instances where general supervision could not be removed from the statute, that the regulations be changed to require that:

(a) any patient treated by a dental hygienist first become a "patient of record" of a licensed dentist;

(b) dental hygiene services be given prior authorization by a dentist no more than 45 days before the services are provided; and

(c) the dentist examines the patient within a reasonable time after the dental hygiene services are provided.

The justification for this resolution was that general supervision endangers the dental health of the public. Its effect would be to increase dentists' control of dental hygiene services.

Since the resolution was passed, efforts have been made in several states to delete general supervision. A bill to this effect was introduced in Connecticut in 1987. In Texas, where general supervision has been permitted for over 30 years, the Board of Dental Examiners proposed rules that would require direct supervision of all dental hygiene functions. (American Dental Hygienists' Association, 1987b) The Virginia Dental Board, which had been on the verge of liberalizing supervision requirements, decided against such action.

Other states are moving to relax their supervision requirements so that dental hygiene services can be provided without the dentist's physical presence. Legislation having this effect has been proposed in Missouri, Ohio, South Carolina, and Wisconsin. At the extreme on this continuum is Colorado, which in 1986 became the first state to allow dental hygienists to provide most of their basic functions without supervision by a dentist. Other functions, designated "supervised dental hygiene", require a dentist's supervision. Diagnosis, treatment planning, and prescription of therapeutic measures continue to be the responsibility of dentists. The statute imposes disciplinary action for dental hygienists who fail to refer patients to a dentist when the treatment needed is beyond their scope of practice. A lawsuit to overturn the statute failed, but is under appeal.

In California, 15 dental hygienists are allowed to clean and examine teeth without the supervision of dentists. This demonstration program is one of the state-sponsored Health Manpower Pilot Projects, under which requirements of state practice acts may be waived for experiments with innovative methods of health care delivery. According to the Office of Statewide Health Planning and Development, the agency responsible for the program, it "is authorized to approve locally conceived and implemented demonstration projects to prepare and utilize health personnel for new or expanded roles." (Office of Statewide Health Planning and Development, 1987).

To qualify for the program the hygienists needed at least four years of clinical experience, certification in cardiopulmonary resuscitation, and special training in instrumentation. They are providing services in offices and in other settings such as nursing homes. Some make house calls to people who are bedridden. Their case records are reviewed by a dentist.

The California Dental Association sued to halt the program on the basis that it was a threat to public health and that the procedures followed by the state and by California State University in approving and implementing the program were inadequate. In August 1987, Judge Rothwell B. Mason of the Sacramento County Superior Court ruled against the dental association. His opinion was that the program was consistent with the legislature's intent to enable experimentation with new kinds and combinations of delivery systems and the need for exemptions from the healing arts practice act to permit such experimentation. (California Dental Association v. Office of Statewide Health Planning and Development et al., 1987)

In neither the Colorado nor the California cases were the substantive issues resolved; both cases, to date at least, have hinged on procedural matters. In neither case were any data or research findings presented to support arguments about risks or benefits. No evidence was presented on the issue of what dental hygienists' training includes and what types of responsibilities they are prepared for. No evidence was presented on the issue of accessibility of services; no evidence was presented on the costs of services.

In its testimony to this committee, the American Dental Association stated, "The American Dental Association believes that all segments of the public should receive the same high standard of dental care". The Association expressed its concerns about the great responsibility placed on dental care providers by the need to diagnose non-dental diseases that manifest symptoms in the mouth and the need to provide services to patients who are severely medically compromised (American Dental Association, 1987).

The committee questioned the ADA spokesperson about circumstances, such as in public schools, where there would be benefit from allowing hygienists to provide prophylactic services to children who had been examined by a dentist but without the dentist present. The ADA's official position is that this form of delivery is not acceptable (Institute of Medicine, 1987).

The situation in dentistry is not unique. It illustrates issues of cost, quality, and access to health services common to many health care fields. The committee is concerned that such issues are faced in the courts, in state legislatures, and in regulatory agencies with neither a body of statistical evidence nor the informed judgments of knowledgable, disinterested parties. Without such information, there is considerable risk that decisions will be made on purely political and economic grounds.

Criticisms as to Outcome In addition to structures and processes of state regulation, there have been substantial criticisms of the outcomes in terms of health care cost, quality, and accessibility. A body of research literature generally calls into question whether state regulation as we know it is serving the public. The literature shows with some consistency that costs (prices) of health services and products (eyeglasses, dentures) are higher in states with more stringent regulation (Begun, 1981; Gaumer, 1984). Incomes of health professionals are also higher in states that restrict activities of their substitutes and auxiliaries.

Higher consumer prices presumably reduce access by keeping some consumers out of the market entirely. There also is direct evidence that restrictions, for instance on practice setting, may reduce the quantity of services produced. Begun (1981), for example, found that optometrists practicing in chain outlets conducted more eye examinations in a day than optometrists in private offices. Many states prohibit practice in a chain.

Impacts on quality of care are less clear, largely because of the great difficulty in obtaining data with which to assess quality. This is unfortunate, because quality is central to the policy debate over the extent and nature of occupational regulation. The various health occupations argue for instituting regulation, for changing their scope of practice, and for limiting the scopes of other occupations entirely on the grounds of quality of care. As Havighurst has observed, referring to physicians, "In general, the prevailing professional view, maintained in large part as a matter of ethics, is that quality of care is the profession's business alone, that there is only one acceptable standard, and that cost has nothing to do with it" (Havighurst, 19—).

As Begun points out, in this context "quality" is ill-defined: "it may refer to the degree of respect for the professional, the degree of communication or humanism in the professional-client relation, the technical sophistication of the service, or the actual outcome of the service." (1981). Other possibilities include the professional's number of years of training, the degree of trust of the professional by the client, and the degree of client satisfaction.

However quality is measured, its relationship to regulation is equivocal. For example, studies by Maurizi (1974) and by Carroll and Gaston (1977) have suggested that quality is actually lower with greater regulation. On the other hand, Holen's 1977 study of dentistry found that more stringent state licensing standards reduced the probability of adverse outcomes. Gaumer (1984) concluded from a review of the literature that state regulation could not be shown to reduce the risk of heath care personnel making mistakes or errors in judgment, nor in general to ensure competence. Begun (1981) showed that restrictions on optometric practice are associated with higher quality, higher cost, and lower accessibility. But quality was measured in terms of duration of eye examinations and their complexity, so the result might be attributable to fewer "low" quality exams being done rather than more "high" quality exams.

Criticisms of outcomes of state regulation also are aimed at its effect on geographic and career mobility. There is considerable research to suggest that state licensure, especially with limited reciprocity, limits geographic mobility of licensed personnel. It also limits career mobility by prohibiting advancement from one level to another and by prohibiting occupational change without additional education. The difficulty of transferring credits, and of obtaining credit for skills acquired on the job means that "initial career choices create a pathway which can be left only by tracing one or more steps backward and essentially starting from an entry level once more." (Carpenter, 1987)

Reforms of State Regulation Twenty years of criticism has led to a number of recommendations for reform of state regulation of health occupations, and some of those have been implemented.

Criteria for regulation: "Sunrise" Procedure In the face of a growing number of occupations seeking licensure and a growing concern about the cost-effectiveness of licensure, 13 states have sought to bring a greater degree of reason and due process to what had been largely ad hoc and political. Minnesota was the first state to enact sunrise legislation in 1973. The Minnesota example, criteria from the Council of State Governments, and principles emanating from the U.S. Department of Health, Education, and Welfare have been used as guides in these efforts.

The criteria generally have been similar. Basically they consist of a set of guidelines to use in deciding whether an occupation should be regulated, and a set for deciding the most appropriate form of regulation.

Criteria for regulating an occupation include evidence of harm from unregulated practice, evidence that the occupation involves specialized skills, and evidence that the public is not protected by other means. More recently, a criterion of cost-effectiveness has been added by some states. Minnesota's statute and current regulations (see Appendix 6) is an example of these criteria. The rules spell out in some detail what constitutes evidence of harm, including the kinds of harm that are recognized and how to assess the potential for harm, including the extent of danger inherent in the occupation's functions.

Minnesota's regulations also appropriately recognize the rather long list of "other means" for protecting the public: supervision by other practitioners, existence of state or federal laws governing devices and substances, employment in licensed facilities, existence of federal licensing or other requirements, existence of civil service procedures, existence of national certification procedures. Consideration of these other means not only guides the decision to regulate at all, but also can guide the design of the appropriate regulatory mechanism if one is needed.

The criteria for selecting the mode of regulation follow the principle of employing the least restrictive activities consistent with public protection should be employed (see Subdivision 3 of the Minnesota statute). The least regulatory mode is the strengthening of the base for civil action and/or of criminal prohibitions. This is essentially a reliance on the deterrent effect of potential civil actions or criminal penalties. The most regulatory mode is occupational licensure, which prohibits persons who do not meet the state standards from engaging in practice. An intermediate mode is the establishment of title protection through registration or certification.

Certification has been used for many years in the field of accountancy. Accountants are certified by the states after meeting certain eligibility criteria. These criteria vary among the states, but all states require passing grades in each of four parts of the uniform national examination given by the American Institute of Certified Public Accountants. Some states have education requirements. Some also require experience in public accountancy. Certified status allows an accountant to offer independent judgment about an organization's "books," the value of its assets, etc. In general, large organizations have their financial accounts audited and evaluated by CPAs. A lender generally requires an audited statement from a firm seeking a loan. The Securities and Exchange Commission requires an audited statement before approving a stock offering. In these capacities, CPAs wield considerable influence, their expertise is widely understood and respected, and they can command substantial salaries.

On the other hand, a person can prepare a firm's financial statements, prepare tax returns, and perform most accounting functions without being certified. Unless a company wants to borrow money or sell shares to the public, it does not have to pay for the services of a CPA. An individual taxpayer is not required to have his tax return prepared by a CPA. Thus, there are lower-cost options available for a wide variety of accounting services. Employing these lower-cost and presumably lower-quality options is not without risk; one might be fined by the IRS or have one's company fail because of low quality accounting services.
However, in this field, consumers are able to weigh the risks and benefits and to choose among an array of providers, given the importance they place on certification, and given their financial constraints.

The concept of economic impact is a relatively new concept in this arena. It makes explicit a concern that the imposition of regulation, whatever its benefits, carries with it certain costs to society. These include any increases in the costs or prices of services, insurance premium costs, costs of additional training, and the costs of operating the regulatory mechanism. In some states these latter costs are defrayed wholly or partly through licensing fees, and thus are "off the books" . However, in evaluating the regulatory burden, these are significant costs, irrespective of how they are financed. There probably is merit in getting them on the books, even if fee revenues are netted against them, as a means of focusing attention on how much this activity is costing society.

The economic impact requirement is very useful. It could and should be expanded to be a broader "environmental impact" statement, in order that other criteria such as access and quality might be incorporated into the considerations. This would encourage allied health occupations seeking state regulation, other parties at interest, and the states to make as explicit as possible the nature of the trade-offs under consideration.

Reforms of the Regulatory Structure and Process The criticisms enumerated above have led to calls dating back to the late 1960s for change in structure and process. These recommendations have been aimed at increasing the public accountability, efficiency, and effectiveness of state regulatory boards.

Board Composition Widening the membership of regulatory boards has been one of the most consistent recommendations made by critics of state occupational regulation (for example, DHEW, 1977; Shimberg, 1980; Begun, 1980; Cohen, 1980). As stated by Tuohy (1976, cited in Begun, 1980, p. 94), "Governments cannot continue to expect that coherent public policy can be achieved by dealing with professional groups as if they were the 'owners' of their respective technologies." The need for public input has generally been associated with consumer involvement, that is, the inclusion of one or more "lay" members of each licensure board. A number of states have taken this step. These members generally are consumers (much of the impetus for having them came from the consumer movement); they may or may not have full membership status--voting privileges, for example.

Although informed consumers have a great deal to offer to the regulatory process, there is some question as to whether adding one or two consumers to a board of 8 or 10 members of the regulated field, especially if the consumers cannot vote, will have the desired effect of making the board more accountable to the public. More far-reaching recommendations to this end include:

— Drawing the "public" board members from the appropriate state agency. Bureaucrats would have the advantage of (a) technical knowledge relevant to the task, and (b) a power base from which to exert leverage on other board members. The power would flow from the agency head and, ultimately, the Governor. (Cohen, 1980)

— Drawing a majority of the board members from outside the regulated occupation. A far cry from one or two "token" consumers, under this proposal boards would be dominated by lay members. (Begun, 1980)

— Drawing board members entirely of persons from outside the regulated occupation. Board members could be not only consumers, but others with relevant expertise in fields such as education, public health, economics, health administration, and health services research. (Cohen, 1980).

In the last case, the board could employ as consultants either individuals or a panel of technical advisors drawn from the regulated field. However, because no member of the board would come from the field, and because board members would have considerable relevant expertise of their own, they would be likely to avoid "capture" or domination by the field and its association(s).

Location of Boards in the State Administrative Structure A second major recommendation to improve accountability has been to strengthen the connections between regulatory boards and one or more state agencies. One approach has been to centralize the administrative support, including record-keeping, the investigative staff, and other common functions of boards in a single state agency, either the health department or a special department established for this function.

Another approach recommended by Selden (1970) is to have a single board that regulates all health occupations, linked to a state agency that provides all administrative, analytical, and investigative support. Subcommittees from each field would develop policies for that field, subject to approval by the full board.

A third approach is to link related health occupations through joint boards. Rather than the single board envisioned by Selden, there would be a number of boards, but the number would be considerably fewer than the number of regulated occupations. Virginia is moving in this direction with a proposal for a joint board for several allied health occupations.

Structural changes in the direction of greater accountability are highly desirable. To be fully effective, however, they should apply to all health occupations, not just those that are the newest. States will need to examine and probably revise their practice acts for physicians and other health professionals, and to review the structures of regulation for those fields. A double standard, one applicable to allied health fields and one to medicine, dentistry, and nursing, is an undesirable state of affairs.

Information for the public The regulatory process has been criticized for being conducted virtually invisibly. Not only has doing business in a closed fashion been a barrier to public accountability, it has kept the regulatory process from serving an important educational function. Through state regulation, the public could become much better informed about the different health occupations, their credentials and the services they offer. Public education also could increase the awareness among state citizens of the importance of occupational regulation. Such awareness would be likely to elicit greater interest and participation.

No single model for accountability is obviously superior to all others. Each state should employ its own mechanisms consistent with the objective of cost-effective public protection.

The Federal Role

The federal government has a very important role in regulating allied health personnel. While the federal government does not regulate health occupations directly, it has indirect influence on state regulatory policy by supporting evaluation research, sponsoring policy analyses, and fostering information dissemination. It has direct responsibility for setting standards for eligible providers under Medicare, however, and a shared responsibility with the states for standard setting under the Medicaid program. Medicare Conditions of Participation, which apply to all institutional providers of health services, are a powerful regulatory tool, because providers that do not meet the conditions may not receive payment from the program except in emergency circumstances. These regulations can be used to define the qualifications of allied health personnel working in participating hospitals, nursing homes, and other health care institutions.

The federal influence is also exerted by the actions of the Federal Trade Commission. The commission has conducted and sponsored research on the effects of regulation and has struck down certain anticompetitive practices of regulatory boards such as prohibitions on advertising.

The federal government has taken an important leadership role in health occupations regulation. Reports issued by DHEW in the 1970s were influential in drawing attention to problems in the mechanisms of state regulation. Recommendations coming out of those reports and out of studies sponsored by the Labor Department helped shape the new directions in state regulation.

The Bureau of Health Professions has supported studies of occupational roles that are useful in devising entry and practice standards. The bureau has also helped develop and disseminate information on state regulatory activities through its support of the Clearinghouse on Licensure, Enforcement, and Regulation (CLEAR) of the Council of State Governments.

The bureau has also supported the National Commission for Health Certifying Agencies (NCHCA), a body that sets standards for organizations that certify allied health personnel. The NCHCA serves a role analogus to COPA in education accrediting, setting standards designed to ensure that certifying agencies are accountable to individuals seeking certification, to their employers, to health care payers, and to the public. A copy of their standards is attached as an appendix to this report.

The federal Medicare program has significant impact on allied health personnel through the way it defines covered services. By means of regulation, the Secretary of DHHS can define the qualifications (for example, licensure) of personnel providing services such as physical therapy, occupational therapy, and speech therapy.

Private control mechanisms

Private recognition of competence also offers some assurance to the public; it may take several forms.

Membership in an association is an indication that an individual has met certain standards for admission. The standards may include qualifications of education or experience, moral character, or others. In a number of allied health fields, a basic requirement of membership is graduation from an education program approved by the Committee on Allied Health Education of the AMA. Dental hygiene programs are accredited by the American Dental Association. Physical therapy education programs are accredited by the American Physical Therapy Association (APTA).

Certification by a private agency or association generally imposes more rigorous standards than those required for association membership. Certification has been defined as:

> . . .the process by which a nongovernmental agency or association grants recognition to an individual who has met certain predetermined qualifications specified by that agency or association. Such qualifications may include graduation from an accredited or approved training program, acceptable performance on a qualifying examination, and/or completion of some specified amount or type of work experience (Shimberg, 1984).

In a paper prepared for this committee, Carpenter notes that certification establishes "standards of competence" and then grants an individual a certificate allowing them to use an occupational title, for example, "registered dietician." ("Registered" is a very confusing term, since it may be used to mean licensed, as with registered nurses, or certified, as in this case.) This mechanism is, of course, analogous to certification by a state, except that it does not include legal prohibition against use of the title by persons not meeting the standards.

Historically licensure was concerned with minimum competency, while certification was reserved to those meeting considerably higher standards. In medicine, for example, certification by a specialty board was (and is) viewed as a "badge of excellence" (Shimberg, 1984). This distinction is less clear cut today, when in some fields certification attests to basic entry standards and in others it attests to special achievement.

Two forms of private accreditation are used as quality assurance mechanisms for allied health personnel. In the context of credentialing allied health personnel, accreditation is most commonly refers to a process through which a private association or agency "grants public recognition to a school, institute, college, university, or specialized program of study having met certain established qualifications or standards" (Shimberg, 1984). Educational accreditation is a form of peer review that is meant "to provide a professional judgment of the quality of the educational institution or program" (Allied Health Education Directory, 1987).

The second form of accreditation that is a quality control mechanism for allied health personnel is the accreditation of hospitals and nursing homes by the Joint Commission on the Accreditation of Health Organizations (JCAH). The Joint Commission promulgates standards that include qualifications of key hospital personnel. Many of these refer to allied health personnel (see Table 7.3).

Conclusions and Recommendations

In light of potential future shortages of allied health personnel and the need to find a reasonable balance between health care costs and quality, the committee believes that it is important to maintain flexible utilization of existing personnel and a variety of routes of entry for new personnel.

It appears that the proliferation of licensure carries with it higher costs to consumers, reduced access to health services, and reduced flexibility for managers. People in health careers are inhibited from changing fields and from advancing within their fields by rigid requirements imposed by state regulatory mechanisms. Although these control mechanisms are designed and carried out in the stated interest of protecting the health and welfare of the public, their effectiveness in this regard has been mixed at best.

Statutory certification, which legally reserves the use of a title to persons with specific qualifications, affords most of the benefits of licensure and avoids many of the costs. In conjunction with public education, it gives consumers the opportunity to choose among providers knowledgably. It does not prevent consumers from choosing lower-quality or lower-cost alternatives. It permits institutional employers some flexibility in their staffing. It permits innovation—new careers may provide new cost-effective methods of diagnosis and treatment.

The committee recommends statutory certification for fields in which the state determines there is a need for regulation, because this form of regulation offers most of the benefits of licensure but fewer of its costs. Medicare and other third-pary payers should accept state title certification as a prerequisite for reimbursement eligibility. Such certification can and should be based on examinations and other eligibility criteria the states establish.

TABLE 7.3: Joint Commission on Accreditation of Healthcare Organizations' (JCAHO) Accreditation Standards for Hospitals

Field	Summary of Relevant Standards, If Any
Clinical Laboratory Technology	The director is a member of the medical staff and preferably a board certified pathologist. There are sufficient qualified laboratory technologists and supportive staff to perform the required tests. A qualified technologist is a graduate of an approved medical technology program or has equivalent education, training, and/or experience; meets current legal requirements of licensure/registration; is currently competent.
Dietetics	A qualified dietician dispenses the nutritional aspects of patient care and assures that quality nutritional care is provided to patients.
Medical Records	A hospital must employ or have as a consultant a registered record administrator or an accredited record technician. If consultants only, medical records supervisors are to demonstrate competence.
Physical Therapy	See rehabilitation services
Occupational Therapy	See rehabilitation services
Radiology	Director of radiology service is to determine the qualifications and competence of department personnel; at least one qualified radiologic technologist is available; a technologist does not independently perform diagnostic fluoroscopy except under certain circumstances. Director of nuclear medicine service is to determine the qualifications and competence of department personnel who are not independent practitioners. "When radiation oncology procedures are performed in the hospital, designated qualified technologists are assigned as needed."
Rehabilitation Services	Each individual providing physical rehabilitation services must meet relevant licensure, certification, or registration requirements. Individual services are defined, including occupational therapy, physical therapy, prosthetic and orthotic services, psychological services, recreation therapy, social work services, speech-language pathology or audiology services, vocational rehabilitation services. No specific staffing standards are given beyond the general one. Separate standards require that comprehensive rehabilitation services be provided "in an interdisciplinary manner," and that the qualify and appropriateness of these services be monitored and evaluated.
Respiratory therapy	Respiratory care services are to be provided by a sufficient number of qualified personnel under competent medical direction. If warranted, services are supervised by a technical director registered or certified by the National Board for Respiratory Therapy, Inc. Other qualified personnel may provide services commensurate with their training, experience, and competence; these include RRTs or certified technicians, persons with equivalent education or experience; qualified cardiopulmonary technologists, and appropriately trained licensed nurses.

SOURCE: Joint Commission on Accreditation of Healthcare Organizations. 1987. Accreditation Manual for Hospitals.

The committee endorses the establishment of "sunrise" criteria to guide states' decisions about whether to regulate health occupations and, if so, how. These decisions should follow these basic principles:

1. The protection of the public is the sole reason for states to regulate health occupations;

2. The least restrictive regulatory mechanism consistent with public protection should be selected, taking into account other means that are in place;

3. If, after due deliberation, the decision is made to regulate an occupation, it must be followed by a continuing commitment of resources on the part of the legislature, the governor, and the relevant administrative agencies.

State regulatory structures and procedures need improving if they are to be effective. In most states the composition of boards, the requirements for entry, and the flow of information to the public are not fully consistent with the public interest.

The committee recommends that states strengthen the accountability and broaden the public base of their regulatory statutes and procedures. In the near term, the committee suggests that:

— Licensing boards should draw at least half of their membership from outside the licensed occupation; members should be drawn from a variety of areas of expertise such as health administration, economics, consumer affairs, education, and health services research.

— Flexibility should be maintained to the greatest extent possible without undue risk of harm to the public. This may mean, for instance, allowing multiple paths to licensure or overlapping scopes of practice for some licensed occupations.

The regulatory process should be conducted as openly as possible and should produce a flow of information to the public, including:

- The scope of practice of the occupation as defined by state law and regulation;
- The eligibility requirements for entry to the occupation;
- Basic information about licensees, including the status of their license, any disciplinary actions taken by the state, as well as basic data such as educational background, collected as part of the licensing process; and
- Board membership and procedures, especially procedures for filing complaints against licensed professionals.

Regulatory boards should be well-connected to the state bureaucracy.

If the state requires graduation from an accredited education program for licensure, the state should take an active interest in the accreditation requirements to ensure that they are consistent with the state's interests.

Finally, the committee believes that decisions by states, accrediting bodies, and by health care payers regarding scope of practice, referral, and supervision should be better informed. The Bureau of Health Professions (or other future focal point for allied health personnelin DHHS) should sponsor a body with members drawn from allied health, other health professions, and from the health and social science research communities to assess objectively the evidence bearing on jurisdictional issues. This body, in consultation with other experts and interested parties, should consider issues of risk, cost, quality, and access. It should draw upon available scientific evidence and point to areas where research is needed.

Well-designed experiments and demonstrations of innovative roles for allied health personnel will provide valuable evidence to guide regulatory policy.

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CHAPTER 8

ALLIED HEALTH PERSONNEL AND LONG-TERM CARE

Introduction

Earlier chapters of this report have discussed whether the supply of allied health personnel will be sufficient to meet future demand. Demand has been understood as effective demand, or the numbers of allied health practitioners for whose services purchasers would be willing to pay, given probable economic constraints. In constrast, this chapter shifts the focus from numbers needed to fill jobs to the qualitative improvements that may be necessary if the allied health labor force is to be responsive to the needs of a particular segment of our society—those requiring long-term care. The improvements relate not only to whether caregivers have the right technical skills to offer, but also whether services are organized and delivered in a way that enhances the quality of life of long-term care consumers.

Clearly, financing policies are a key to quality, although the available evidence on nursing homes at least has not shown what the minimum reimbursement, staffing levels, and staff qualifications must be to provide adequate care. (IOM, 1986a). Resolving these financial issues is beyond the scope of this study. However, the committee believed that it could usefully contribute to policy discussions of long-term care reform by addressing human resource management and education issues that emerged during the course of its inquiry. As a means of gaining insight into these issues the committee supplemented its review of the literature, discussions with experts, and its own experience with site visits to 11 long-term care facilities in urban and rural areas of three states (California, North Carolina, and Virginia). These site visits served to guide the committee's selection of issues it could reasonably address in the context of its overall report. Collaboration of allied health personnel with one another and their interactions with other health caregivers was one recurrent issue. The extent to which allied health curricula prepare students for long-term care settings was another.

Long-Term Care and Its Consumers

Although long-term care is defined in a number of different ways, for the purposes of this study it is a broad range of clinical, social, and personal supportive services for people who need assistance over a sustained period of time to maintain or improve well-being. The goal of long-term care is the maintenance or restoration of the highest possible level of physical, mental, and social functioning of individuals within the constraints of their illnesses, disabilities, and environmental settings (Meltzer et al., 1981; Kane and Kane, 1982).

In emphasizing the multiple types of services necessary to achieve the highest attainable quality of life and personal autonomy, this definition has two important implications for those who provide care and how they interrelate with one another. First, caregivers of many different professions and disciplines, as well as family and friends, must be involved. Second, this is a process that relies on a flow of information concerning an individual's needs, services, and potential for recovery.

Long-term care can be provided in institutional settings, such as nursing homes (mostly skilled nursing and intermediate care facilities), institutions for the mentally retarded, residential care facilities (e.g., board and care homes), long-stay hospitals (e.g., psychiatric hospitals), specialized schools, and hospices. It is also provided in ambulatory care settings, in the community through day care programs, and in the home through home care services. Some rehabilitation facilities provide long-term inpatient care, but also offer specialized ambulatory care over an extended period of time.

Although much of this chapter is about the elderly, there also are others who need long-term care services. They include infants with birth defects, developmentally disabled children, adolescents who have suffered head trauma or spinal cord injury, laborers with emphysema, and elderly people with multiple sensory deficits. They also include the chronically mentally ill and the severely retarded. The epidemic of acquired immune deficiency syndrome has focused attention on the long-term care needs of persons with chronic, infectious diseases.

Because demographic projections suggest that the largest increase in the need for long-term care will come from the aging of the population, the service needs of the elderly have received the most attention of late. Indeed, the committee's examination of this topic coincides with the release of two major reports. The first, mandated by Congress, was co-chaired by the directors of the National Institute on Aging and the Bureau of Health Professions in the Health Resources and Services Administration. Their report examines "the adequacy and availability of personnel prepared to meet current and projected needs of the elderly Americans through the year 2020". (National Institute on Aging, 1987)

A second study was conducted by the National Task Force on Gerontology and Geriatric Care Education in Allied Health. Established by the American Society of Allied Health Professions, the task force explored the implications of demographic and disease pattern trends for allied health professional education and practice (National Task Force, 1987).

The two studies reinforce some of the themes we will develop in this chapter. An aging population in need of long-term care will increasingly dominate the practice of most health care workers and will create pressure for greater numbers of personnel in total. Preparation for this future will require significant interventions in the way we educate and socialize students to treat patients and work with other health colleagues in the long-term care environment.

Determinants of Need for Long-Term Care

A number of factors--health and functional status, income, living arrangements, marital status--influence who is likely to become a long-term care consumer and the types of services they receive. A review of these factors reveals why there is concern about the capacity of the health care system to meet its future challenges:

o The need for the formal support of nursing home care increases sharply with age as do the effects of chronic disabling disease. The utilization rate for persons 65 to 74 years of age is 2 percent; 6 percent for those 75 to 84; 23 percent for those 85 and over (Rice, 1985).

o If current morbidity, disability, and functional dependence rates and patterns continue, by the year 2000 about 50 percent more noninstitutional elderly will require the help of others in daily living activities than required such help in 1980. At the same time, the numbers needing nursing homes could increase by 77 percent. In addition to the elderly, it is estimated that the number of individuals under 65 years of age who are functionally dependent due to chronic disabling disease may well equal those over 65 (IOM, 1986b).

o Marital status influences the use of long-term care services (especially nursing homes) because people without spouses may not have anyone to provide the personal care that would allow them to stay in the community. In 1985, 84 percent of the elderly in nursing homes were without spouses, compared with 56 percent of functionally impaired people living in the community (NCHS, 1987a; Macken, 1986). If women continue their more rapid mortality improvements than men (IOM, 1986b), there will be more unmarried spouses requiring nursing home care.

o Infectious disease patients are likely to cause a noticeable increase in the demand for long-term care and the services provided by allied health personnel. The number of AIDS patients jumped from 183 cases in 1981 to more than 49,000 cases at the end of 1987 (Center for Disease Control, 1987a). The U.S. Public Health Service estimates that 1.5 million people are already infected with the AIDS virus (Center for Disease Control, 1987b). Although relatively small proportions of AIDS patients may need institutional long-term care (those with dementia, for example), there are indications that community care could bring a large demand for home health services (Widdus, 1987; Braun, 1987: Long Term Care Management, 1988).

o More than a quarter-million infants are born in the U.S. each year with physical or mental defects (March of Dimes, 1987). Despite advances in prenatal detection of diseases causing disability, data from the Centers for Disease Control show that the incidence of most types of birth defects remain substantially unchanged during the period 1970-71 to 1981-83 (Edmonds and James, 1984).

o For the past 15 years, the level in the U.S. population of the severely developmentally disabled has remained steady at approximately 1.6 percent. However, the type of care that they receive has changed dramatically during that time. In 1967, many lived in large public or private institutions. Today, there is an increasing demand for relatively small community-based facilities. The number of such facilities has grown from about 4,400 in 1977 to 20,000 in 1986. With these structural changes, some researchers have detected a substantial increase in staffing intensity that is likely to continue (Braddock, 1988).

Ideally, an assessment of changing demographic and epidemiological patterns, such as those described above, should lead to an understanding of the preventive, curative and rehabilitative needs of persons who become elderly or ill. Understanding the care requirements clarifies the type of education and training programs caregivers ought to have to meet the needs of patients—all of which should lead to the development of appropriate education programs.

Unfortunately, this idealized sequence does not happen for many reasons. Chief among these reasons is lack of adequate financing limiting who gets into the formal care system, the amount and quality of services provided, and the attractiveness of long-term care to health workers. The scope of the study does not permit exploration of the broader financing problems of long-term care; the committee devoted its attention to possible education strategies and human resources management interventions in nursing homes, home care, and rehabilitation facilities—three settings in which allied health personnel play vital but different roles. We will also explore the problems in these settings of integrating allied health services with those of other caregivers, including aides, who may initiate, collaborate with, or at times substitute for services of allied health personnel.

Nursing Homes

The majority of institutional long-term care is provided in nursing homes. In 1985, there were 19,100 nursing homes with 1,624,200 beds. This represents a 22 percent increase in the number of homes and a 38 percent increase in the number of beds since 1974. (NCHSb, 1987)

Despite the demographic and disease pattern changes described earlier, the nation's stock of nursing home beds is not keeping pace with the growth in demand, let alone probable need. The result is that nursing homes usually have high occupancy rates and long waiting lists allowing operators to select "light care" and private pay patients. This works to the detriment of those who are poor and most in need of care. Efforts to turn this around are constrained by states seeking to limit Medicaid budgets through certificate-of-need regulations that control the building of new beds (AHCA, 1985; AHCA, 1986). Future growth will depend on the federal government agreeing to enlarge the flow of dollars into long-term care or helping create incentives for the small but growing private insurance market.

In 1985, there were about 1.2 million full-time-equivalent nursing home employees. More than 700,000 provided personal care, of which nurse's aides and orderlies were the largest group (71 percent). The number of allied health professionals providing nursing home care on a salaried basis is comparatively small. In 1985, there were approximately 7,000 dietician/nutritionist, 2,900 registered physical therapist, 2,600 registered medical record administrator, and 1,500 registered occupational therapist FTEs (NCHSb, 1987, Strahan, 1987). Despite efforts to constrain bed growth, BLS projects that nursing home employment will grow to the year 2000 at an annual 3.8 percent rate, or about 3 times the projected growth for the overall economy (Personik, 1987).

Nursing Home Residents and the Organization of Care

The typical nursing home resident is an 80-year-old white widow who has several chronic medical conditions. She was admitted to the nursing home about one and a half years earlier after being a patient in a hospital or other health care facility. Seventy-five percent of elderly residents in 1985 were female; only 6 percent were black and less than one percent were other races. The fact that a higher proportion of the elderly white population (5 percent) receives nursing home care compared with black (4 percent) and other races (2 percent) is likely due to substitution of informal care of non-whites in the home for institutionalized care (NCHS, 1987a; Macken, 1986).

A patient enters the nursing home by physician referral or by direct application of the family. All services must be prescribed by a physician and furnished according to a written plan initiated by the physician. The care plan is developed in consultation with the appropriate nursing and allied health personnel. For example, an occupational therapist assists the physician by evaluating the patient's level of functioning, by helping to develop the plan, by preparing clinical and progress notes, by educating and consulting with the family and other agency personnel, and by participating in in-service programs. Occupational therapy assistants, under the supervision of a qualified occupational therapist, perform services planned and delegated by the therapist. They assist in preparing clinical notes and progress reports and help educate the patient and family (Occupational Therapy Medicare Handbook, 1987).

To be certified under Medicare conditions of participation, nursing homes must assure the availability of allied health services. But the number of full-time allied health personnel employed is small because most nursing homes find that reimbursement does not stretch to provide many of these services. To conserve resources, consulting arrangements and part-time work are the norm for therapists and other allied health workers. When funds are available to hire allied health personnel, many facilities appear to have difficulty in attracting such staff.

Registered nurses supervise or coordinate the direct care of patients, and one tool for enhancing communication among caregivers is the team meeting. The regularity of these meetings varies among nursing homes. Often headed by nurses, the team may not necessarily include allied health personnel. Optimally, the meetings should not only provide an opportunity to exchange information about patients, but also serve as a way of organizing care that best responds to individual patient needs.

One approach to incorporating allied health personnel into a team effort was described to the IOM's Committee on Nursing Home Regulation. In this model allied health specialists serve a strong educational rather than direct patient care role:

> Each nursing unit has a primary care team composed of the physician, head nurse and social worker for that unit. The primary care team guides the resident care planning. All members of the team have an equal voice in this planning. Auxiliary staff such as physical therapists, occupational therapists, leisure activity specialists, dietetic technicians, etc., are assigned to each unit and work with the primary care team. In addition to individual relationships, unit team members plan and assess resident care in a variety of organized meetings. These types of meetings may have a different focus. For example, unit clinical meetings focus on residents' psychological problems, rehabilitation rounds focus on physical therapy. These meetings have one thing in common, however; they include all care givers including nurse aide staff. (Boehner, 1984)

As a practical matter in today's nursing home environment the rehabilitation services that allied health personnel might be directly providing are either absent or stretched across a large patient base. Linkage of allied health expertise to the activities of nurses and aides becomes a critical element in how well patients can improve their functioning. The linkage is dependent on both opportunities for effective communication between allied health personnel and the nursing staff as well as the ability of other caregivers—aides in particular—to receive and act upon the advice of the allied health practitioner.

Aides

The quality of life for patients is significantly affected by the quality of care provided by the caregivers who have the most frequent patient contacts. These are the aides. The typical nurse's aide is a woman who is about 35 years old, and who has no more than 12 years of education. She has little or no training in nursing skills. She has been employed in her current job less than two years and has less than five year's total experience as a paid caregiver (NCHS, 1987; Strahan, 1987). Most aides are white, but a sizable portion (32 percent) are black or other minorities, higher than their representation in the labor force as a whole (13 percent) (Kahl, 1987).

On an average day, the aide has a wide range of activities. For example:

> The aide is expected to do passive range-of-motion exercises for stroke or paralysis patients. If hemorrhaging occurs, she must immediately elevate the body and apply pressure before calling the nurse. She must use correct body mechanics or seek help in moving patients. The aide is expected to reconcile food service deliveries with patient's dietary restrictions. She regularly observes changes in patient status such as whether a patient's toe nails need to be cut and whether decubiti are present. She monitors food and water intake, and emotional states. A capable aide would notice potential circulatory problems, changes in temperature, and paralysis. Aides also provide clean, wrinkle-free bed linens. They receive and return linens to the laundry or food trays to the kitchen. Aides are expected to initiate and facilitate interaction with residents and to assist in and encourage ambulation" (Brannon and Bodnar, 1988).

As the foregoing list of duties illustrates, aides carry large responsibilities for which they may have little training or experience to prepare them. There is also little status, recognition, or compensation for this key role. While most often viewed as part of the nursing staff, the problems aides encounter are, nonetheless, ones that also concern allied health practitioners or overlap the responsibilities of allied health assistants. For example, both nurse's aides and occupational therapy assistants play a role in patients' daily hygiene and rehabilitation exercise programs.

The recent Institute of Medicine report on nursing home regulation, in relating improved functioning of residents to their sense of well-being, noted how aides shape the residents' social world:

> . . . 80 to 90 percent of the care is provided by nures's aides and the quality of their interactions with the residents—how helpful, how friendly, how competent, how cheerful they are and how much they treat each resident as a person worthy of dignity and respects—makes a big difference in the quality of a resident's life. (IOM, 1986a)

Because of their importance to the quality of care provided in nursing homes, as well as in home care, the levels and content of aide training has been a focus for reform. It is interesting to note that the recommendation from the IOM Nursing Home Standards Committee to make aide training a regulatory standard was one of the few exceptions to an approach that relied principally on patient outcome measures in assuring quality. Following the IOM's recommendation, the Health Care Financing Administration proposed a rule requiring aides to receive a minimum of 80 hours of training (Federal Register, 1987). Shortly, thereafter a provision of the Medicare law requiring 75 hours of aide training was enacted through the Omnibus Reconciliation Act of 1987.

In many nursing homes, annual turnover is extremely high for aides, and in some cases all of the aides may be replaced in the course of a year. High turnover has been linked to several factors, most importantly employee pay and benefits. Aides generally earn only about $10,000 per year (Kahl, 1987). It is not surprising then that during site visits, the committee heard reports of aides changing jobs for a 25-to-50-cent per hour increase in pay.

In addition to turnover, earnings also play a part in a growing recruitment problem. We have already referred in this report to the general tightness of the labor market for technically oriented personnel. Similarly young, low wage service workers will also be at a premium. Some in the nursing home industry see themselves in direct competition for these employees with the fast-food industry, for instance, which is beginning to offer higher starting salaries and the attraction of greater opportunity to socialize with peer workers in a less onerous atmosphere (Kerschner, 1987). Because of this competition, there is increasing interest in targeting older individuals for recruitment. These older workers (whom McDonalds fast-food restaurants also is recruiting), whose cohort will be expanding in the population, already represent a sizable portion of the aide-level workforce: 40 percent of aides are over the age of 35 (Kahl, 1987).

Pay alone, however, will not solve recruitment, retention, and turnover problems. Aides' poor self-perceptions and lack of involvement in the decision-making process regarding their responsibilities will require action by management (Waxman and Berkenstock, 1984). Lack of career ladders, work scheduling, management attitudes, and understaffing are other common frustrations voiced by aides themselves.

In light of their critical role in patient well-being and rehabilitation, the questions of how much training aides need to function effectively, how they relate to others who provide nursing and allied health services, and what kinds of pay and careers suit their level of responsibility are questions that nursing home management cannot avoid. If in the future we are to have sufficient numbers of people to carry out the responsibilities that aides presently assume, the nursing home industry will need to come to grips not only with improving low wages and working conditions, but the organizational challenge of deploying staff wisely. Allied health caregivers in nursing homes will necessarily become involved in these issues. Enhanced pay and responsibility for aides will require that allied health personnel forge new working relationships and increasingly accept pedagogical roles.

Home Care

Home health care, often viewed as a substitute for nursing home placement or extended hospitalization, shares many of the same generic problems of nursing homes. Agencies have difficulty recruiting and retaining staff at the aide level and teamwork is frequently inadequate among nursing and allied health personnel. These problems are exacerbated in home care, which by its very nature requires staff to operate with less direct supervision.

Home Health Agencies and Personnel

Although formal community care such as from home health agencies accounts for only 15 percent of public long-term care expenditures, it has been one of the fastest growing segments of the health care industry. The number of Medicare-certified agencies tripled from 2,212 in 1972 to 6,007 in 1986, but dropped slightly to 5,877 in 1987 as agencies reacted to restrictions in Medicare rules. In 1986, there were 105,038 salaried, full-time employees. Registered nurses represented the largest category (34 percent) of personnel followed by aides (25 percent). About 6 percent of the employees were physical therapists, 2 percent were occupational therapists, and 3 percent were speech therapists (National Association for Home Care). Because some therapists operate on a contract basis or work in agencies not certified by Medicare, these proportions probably understate the number working in home care. For example, about 22 percent of physical therapists work at least part of their week for home health agencies (American Physical Therapy Association, 1987).

Home health care is not covered by the prospective payment system but, since 1985, limitations have been applied to reimbursement for home health services. As a result, many agencies choose not to participate in Medicare and limit their clientele to private-pay patients. The National Association for Home Care estimated in August 1987 that there were an additional 3,700 agencies not certified for Medicare (National Association for Home Care). Little data are available on recipients or reimbursement under private insurance. Medicaid also can include home health benefits, but payment levels have fluctuated greatly over the past decade and vary considerably by state. In 1987, New York accounted for 77 percent of all Medicaid home health expenditures compared with California's 7 percent (Rabin and Stockton, 1987).

Home Health Clients and Organization of Care

About 80 percent of home health recipients are post-hospital referrals. The typical process of referral from physician to nurse to allied health personnel can operate smoothly, but also masks a set of uneasy relationships.

The nurse's view of her role has been characterized by Mundinger. "When the referral and physician's plan of care are received by the agency, an initial nurse assessment visit is made within three days. When the nurse's plan is approved, it becomes the operational one for patient care and replaces the original physician order:

> The plan devised by the nurse includes all of the care to be given as well as recommendations for referrals. For example, if physiotherapy (sic) is being considered as care needed, it is the nurse who makes the assessment visit to determine whether it is in fact really necessary. The nurse decides on the need for a home health aide. The nurse also can make referrals for other home health services such as occupational therapy, speech therapy, and social worker services. The plan that is submitted to the physician for signature includes all reimbursable care the nurse deems necessary. It also includes illness prevention and health maintenance care required by the patient.
>
> Physicians, as do most professionals, tend to implement the therapies that they know best, value, and use in their own work. Therefore, home care, traditionally a low-technology and low-cost venture, under Medicare has become a service filled with

> high-cost care. It is not unusual for a physician to order a battery of expensive blood tests rather than make a home visit, or utilize physical therapists for routine range of motion or ambulation of homebound patients. Physicians should be aware that nurses can teach families to carry out these exercises or that a visiting nurse's assessment and history can tell more than blood tests in many cases" (Mundinger, 1983).

The nurse arranges for various services to be delivered separately by therapists or aides, none of whom may meet with each other face-to-face as a team. While important information can be exchanged through the record, the amount of direct collaboration for patient problem solving among caregivers is often minimal.

Because of this pattern of care, growing attention has been paid to the issue of who is the care manager, who controls the mix of services, and how multiple caregivers coordinate their services. The care manager (or case manager) is responsible for ensuring the coordination and continuity of services (Levine and Fleming, 1986). As the quotation above illustrates, nurses presently see themselves fulfilling this function. But physicians and allied health personnel are not necessarily willing to concede this point.

The following represents the viewpoint of the Health and Public Policy Committee of the American College of Physicians, which has argued that physicians ought to be actively involved in assessing the continuing functional as well as medical needs of homebound patients, and advising patients on the use of home health services:

> Although Medicare requires the physician to certify a home health treatment plan, typically the physician describes the patient's medical condition to a home health agency, and a registered nurse actually develops and implements the home care plan.
>
> Physicians should play an important role in home health care, not only as providers of medical care, but also as case managers and coordinators of care. Physicians should assure that their patients continue to receive high-quality medical care after discharge from a hospital and while receiving treatment in the home.
>
> Unfortunately, the current reimbursement system does not provide any incentives for physicians to become more involved in home health care. Time spent

> communicating with home health care personnel, devising home treatment plans, completing certification forms, consulting with the patient and family by telephone, or traveling to a patient's home is not reimbursable. Indeed, HCFA maintains that these costs are subsumed in physicians' payments for office visits and home visits (Health and Public Policy Committee, 1986).

From the perspective of allied health fields, the interdisciplinary group that constitutes the home health team, "is overly dependent upon a single type of profession, the physician, to write orders." The needs of the patients ought to determine whether case management is accomplished by an individual therapist, social worker, nurse, or a team. But current reimbursement practices, allied health leaders have argued, do not give the team adequate control over how resources are allocated for the patient's care plan. (National Task Force, 1987)

Without a reimbursement mechanism that creates incentives for coordinated and appropriate use of the home care services potentially available from a wide array of providers, it will be difficult to overcome problems of fragmentation, duplication of services, and interprofessional competition. Short of such a payment scheme, the solutions commonly cited in the home care and case management literature offer the best hope for improvement. These include greater use of team conferences, more complete documentation of patient records, increased attention to defining the functions of different types of practitioners in home care, more vigorous case management on the part of home health agencies, and educational experiences that prepare students for interdisciplinary collaboration and case management (MacRae, 1984; Steinhauer. 1984; Trossman, 1984).

Rehabilitation

In moving from consideration of nursing homes and home care to rehabilitation facilities, a major distinction arises: the team approach to clinical management is a well-recognized fixture in the rehabilitation world.

Collaborative behavior among health care practitioners is reinforced by the fact that rehabilitation patients are generally treated for a functional rather than a medical disability. By regulation, for Medicare reimbursement patients must receive a minimum of three hours of physical therapy, occupational therapy, speech therapy and/or orthotist and prosthetist services per day for five day per week (section 3101.11 (D)(3), Part A. Medicare Intermediary Manual). The patient who regresses or no longer improves in function must be discharged into another care environment. The current payment system places a premium on functional assessment and progression toward improved functioning.

There has been significant growth in rehabilitation programs in the last thirty years and a 50 percent growth in the number of rehabilitation beds in the last five years. Today, there are 73 rehabilitation hospitals with 6,225 beds in the United States. There also are 512 distinct rehabilitation units with about 13,000 beds in general hospitals. Rehabilitation facilities are currently exempt from the Medicare prospective payment system, because an equitable predictor of resource consumption on which to base payment has yet to be found. (Rehabilitation services in intensive care and in medical-surgical units of acute care hospitals, however, are not exempt.) Approximately 32 million people are physically disabled, and 12 million people severely disabled. The numbers of severely disabled have increased and will continue to increase with the aging of the population and with technological advances that improve prospects for children with birth injuries or congenital defects (Lesparre, 1987; England, 1987).

Because patients in rehabilitation settings need specialized and intensive services, the staff typically includes full-time departments of physical, occupational, and speech therapy, radiological and laboratory services, and sometimes respiratory therapy. There are also social, psychological and vocational services on a-consultant basis. Although the staff in rehabilitation hospitals typically work in teams, some experts call for an additional category of case managers to help assure appropriate and timely referrals, reduce admission delays, and assess insurance gaps (Lesparre, 1987; England, 1987).

By tradition, allied health practitioners, with nurses, play a central role in the delivery of care as a team. For example, the ratio of FTE physical therapists to registered nurses is 1:2 in rehabilitation hospitals compared with 1:43 in acute care hospitals (American Hospital Association, 1987). A recent survey by the National Association of Rehabilitation Facilities (NARF) showed that 65 percent of the total cost in rehabilitation hospitals was attributable to staff salaries, wages, and fringe benefits. This compares with an average of about 57 percent for all hospitals. Intensive use of physical therapists, occupational therapists, and specialized nurses results in higher personnel costs in rehabilitation hospitals. Salary increases of 7 percent a year for physical therapists, 6 percent for occupational therapists, and 5 percent for nurses since 1985 reflect the difficulties these hospitals are experiencing in attracting personnel. The competition for these employees has also resulted in growing recruitment costs, and increased use of contract personnel. (NARF, 1987)

A survey of 43 rehabilitation facilities in California found vacancy rates of 15.6 percent for physical therapists, 8.6 percent for occupational therapists and 10.7 percent for speech-language pathologists. Vacancy rates for physical therapy and occupational therapy assistants exceeded 20 percent. Among the consequences of these staffing problems, 24 percent of the respondents experienced admission restrictions, 76 percent show an impact on outpatient waiting lists, and 58 percent delayed initiation of new services or curtailed existing ones (California Association of Rehabilitation Facilities, 1987).

Rehabilitation hospitals see themselves at a disadvantage in competing for allied health personnel in tight labor markets. They attribute their difficulties to students' lack of exposure to the potential of a career in rehabilitation, which is perceived to be an arduous, unattractive job, bringing little recognition. Rehabilitation administrators fear a continuing diversion of personnel to more attractive practice settings where patients are less incapacitated and earnings are higher.

A brief examination of the experience of the Veterans Administration (VA), a major provider of rehabilitation services in the nation, offers some insights into the problems often faced by many rehabilitation facilities, especially those that are public institutions. While the VA labors under personnel and other constraints peculiar to public facilities in recruiting and compensating its employees, the implications of personnel shortages and coping strategies are an instructive preview of what the future for all rehabilitation facilities could be under widespread shortages.

The VA Experience

Interviews with central office officials and chiefs of physical therapy and occupational therapy at a number of VA medical centers, revealed a consensus on a number of points. Many of the centers' recruitment and/or retention problems are due to competition for these occupations in the nonfederal sector. Substitution of less qualified caregivers was infrequent, although health care delivery services were sometimes curtailed as a result of the shortage. The problem appears to be worsening; patient load is increasing while physical therapy and occupational therapy staffs continue to decrease.

At one medical center in a mid-Atlantic state, half the physical therapy slots were vacant. Although physical therapy assistants are employed, they are not used in lieu of licensed physical therapists because they are not permitted to evaluate patients. The medical center employs six corrective therapists (a type of rehabilitation personnel used mostly in the VA), but they too are comparatively limited in the type of care they are permitted to provide. A corrective therapist is assigned to the unit to assist patients in walking. Also, because of lack of staff, the physical therapy treatment room in a newly built nursing home care unit remains closed. The chief of physical therapy who carries a full patient load in an effort to offset the shortage, stated that nonfederal employers in the area were paying $24,000-$28,000 for new graduates while the VA starts them at $18,000. She added that the presumption among many recent graduates is that they ultimately will enter private practice. In her experience, this differs markedly from the goals and assumptions of physical therapists in the past, most of whom spent their entire careers employed by medical facilities.

A large medical center in Southern California has a large geriatric patient population, a spinal cord injury unit, and large orthopedic caseload. The center employs a number of well-known specialists in physical therapy. As a result, recent graduates flock to the medical center for the quality of the training they can receive there. Recruitment success is high; vacancies are relatively low, but physical therapists typically remain no more than two years. Thus, patients are treated for the most part by young, inexperienced personnel.

A relatively small Southern medical center cited both physical therapist and occupational therapist recruitment problems limiting the number of bedside treatments provided. There are physical therapy and occupational therapy education programs in this city, but the institutions have been unable to recruit graduates before they relocate to other geographic areas where the pay is higher. Because the department is too small to require a chief of service, the medical center needs an experienced occupational therapist before it can recruit recent graduates who will need seasoning.

Lack of occupational therapists in another Southern medical center has resulted in slight modifications of the duties of the assistants and such adjustments as program cutbacks and delays in starting new programs. The chief of occupational therapy stated that nonfederal occupational therapy jobs in that city pay $4,000-$5,000 more than what the VA pays, and it is virtually impossible for the VA to hire experienced therapists. The situation seems unlikely to improve as a recent survey found that there are 54 job openings in occupational therapy in that city.

At a small rural VA medical center in the northeast, physical therapy slots have remained vacant for as long as two years. In addition to its lack of salary competitiveness in a region with high demand, this hospital also believes that its large geriatric population does not offer the variety that many practitioners seek.

As discussed in Chapter VI and in the VA case examples, health care administrators who face personnel shortages have relied on some strategies to handle the deficiencies in the short run. These strategies include extensive use of overtime, targeting services to the patients most likely to benefit from them, and downward substitution (or cross-substitution) of allied health personnel to the extent that regulations permit. In the long run, unless rehabilitation facilities are willing to reconcile themselves to the sorts of adaptations we have described in the VA cases they will have to improve their capacity to compete for allied health graduates.

The committee believes that the public will not wish to nor should accept service compromises in the quality and availability of rehabilitative care due to major shortages in allied health personnel. Although current data and analytic techniques are not capable of specifying the numbers of personnel needed above those who are likely to be demanded under current reimbursement and human resources policies and practices, in the committee's judgment, rehabilitation facilities will not fare well unless the supply grows substantially along with an increase in the share of those choosing to engage in this difficult work.

As we have noted throughout this report, salary adjustments are an inevitable response to this competition. Indeed, the VA has sought exemptions from Congress on salary scales. But along with these adjustments must come a more careful and sustained rethinking of the services provided and who provides them. The initiatives to do this are likely to come from health care delivery sites attempting to cope with service demands and constrained budgets, but educators should not distance themselves from this rethinking process. A new relationship between health care and academic institutions must be forged. Our recommendations in the next section address the nature of this partnership.

Conclusion and Recommendations

In this chapter, the committee has concentrated on three generic human resource problems that plague the provision of long-term care:

1. Minimally trained personnel are often the primary patient caretakers, especially in nursing homes and home care. As a result, there is too little attention to the linkage between nursing and allied health services in the hands-on care activities of aides.

2. Current efforts to incorporate care of the aged and chronically disabled into the allied health curriculum are inadequate in view of the important impact these patients will have on the health care delivery system.

3. Collaborative behavior among allied practitioners as well as between allied health practitioners and other health care workers is insufficiently promoted by management in nursing homes and home care, and by education institutions in the educational experiences provided to students.

Education of Aides

Passage of the provision in the Omnibus Reconciliation Act of 1987 requiring a minimum of 75 hours of initial aide training should mark the beginning of a long-range effort. Content to be covered in nurses aide training is to include basic nursing skills; personal care skills; cognitive, behavioral, and social care; basic restorative services; and resident's rights (U.S. House of Representatives, 1987).

The committee views this training requirement as a reasonable starting point to raise the skills and knowledge of entry-level workers, who provide most of the direct patient care. There is also an urgent need, however, for a visible pathway leading to higher levels of education for aides who wish career progression, and improved remuneration. Such a pathway into nursing or allied health fields would contribute to raising the moral and self-image of workers and ultimately reduce the costly turnover of personnel.

In recognition that the greatest amount of direct patient contact and care in long-term care settings and programs is provided by personnel at the aide level, the federal government and other responsible governmental agencies should require education and training to raise the knowledge and skill levels of these personnel. Demonstration projects should be funded to encourage joint efforts by educators and employers in creating viable career paths for aides.

Tolerance and empathy with old, chronically ill, disabled, or demented patients is an elusive but critical attribute to be sought among caregivers. Without this attribute, individuals are not likely to remain in long-term settings as a career. Long-term care employers and educators should identify and nurture those with this "people-oriented" attribute. One approach might be for employers and educators to develop local plans in which service in long-term care settings would earn employer-paid educational credits. The credits could then be used by personnel to further their educational objectives. Such an investment would yield at least three desirable results: improved quality of care for patients; enhanced recruitment of minorities, young people, and minimally educated individuals; and, increased stability in the segment of the labor force providing direct care. This approach would be particularly attractive if educational programs in the established allied health professions would reserve a small proportion of their entry positions (e.g., 10 percent) for applicants from such long-term care settings.

Other innovative programs jointly sponsored by academic institutions, such as community colleges, and employers should also be considered in creating a career path. The committee was impressed with the concept of an apprenticeship model, which has had some success in the skilled trades, but has not received the attention it perhaps deserves in the health care fields. The model stresses on-the-job practical experience combined with formal training. A key element in the success of such a program is thatthe student-workers' prospects for a "good job" in terms of pay and responsibility be rewarded at the end of the program. These "good jobs" while not plentiful in today's long-term care industry, must be developed in the decade ahead if the industry expects to compete in tomorrow's labor market and improve quality of service they provide.

Enhancing The Curriculum

Although allied health students gain technical expertise in areas of concentration during their education, many have only limited exposure to chronically ill and disabled persons. They may therefore have only a superficial understanding of the complexity of the physical, mental, emotional, and social problems of impaired persons and their families. When in training, allied health students may not rotate through long-term care facilities or programs to experience personally the technical difficulties in evaluating and caring for older or chronically disabled persons.

The committee recommends that all allied health education and training programs should include substantive content and practical clinical experience in the care of the chronically ill and aged. In general, such curricula should include information on the demographic shifts and changing epidemiological patterns of diseases and disabilities, the biological and psychological aspects of chronic illness and aging, the common medical problems seen in patients, legal and ethical dilemmas, the medical and psychological aspects of death and dying, health promotion and disease and disability prevention, interdisciplinary team participation, the evaluation and assessment of patent's needs, the roles of related health professionals, administration and management techniques, communication, and supervisory skills.

Among these topics the need for assessment, pedagogical, and coping skills particularly impressed the committee during its site visits. Because of shortages or uneven distribution of allied health professionals, each of the allied health specialties may not be available to make an assessment of the patient from their own disciplinary perspective. Therefore, it is important that all professional care providers acquire knowledge that enables them to make physical, psychological, and environmental assessment of an individual patient and to develop an appropriate plan of care. They need this broader knowledge even though some of the needs of the patient may be outside the narrow area of expertise of a given allied health profession. Because allied health practitioners may be employed as consultants having responsibility for a large number of patients or residents, they must also have the skills to instruct aides and family members in activities in the plan of care and then be able to monitor the effectiveness and quality of the assistance given to patients.

A major barrier to curriculum reform is the shortage of faculty appropriately trained and experienced in the care of the chronically ill and disabled. In an effort to combat deficiences in the training of personnel and faculty, the Health Resources and Services Administration established regional resource centers through its Geriatric Education Centers program. The program, which began in 1983, supports the multidisciplinary training of medical, dental, osteopathic, optometric, pharmacy, pediatric, nursing, and allied health students, faculty, and others in geriatric health care. Other governmental programs that have provided multidisciplinary training include special project grants and the Area Health Education and Centers (also sponsored by HRSA), Long-Term Care Gerontology Centers (Administration on Aging), and Geriatric Research, Education, and Clinical Centers (Veterans Administration). Despite these programs the National Institute on Aging task force estimates that the current number of faculty members specializing in aging and geriatric care ranges from 5 percent to 25 percent of the total number needed (National Institute on Aging, 1987). A major focus for the faculty development grants recommended in Chapter V should be encouragement of more faculty specializing in geriatric care.

Orienting allied health education toward geriatric care will not make salaries more competitive, change the fact that patient care is physically and emotionally difficult, or improve working conditions. The committee believes, however, that such education will help those who do choose to work in these settings remain longer by giving them the necessary knowledge and coping skills; it will increase the opportunity for more students to consider the possible rewards of such a career; and it will encourage more faculty to engage in health services and clinical research relevant to the problems faced by long-term care providers.

Improved Teamwork

We have noted that the collaborative behavior in rehabilitation hospitals is frequently absent in nursing homes and home care. In the absence of financing incentives that encourage teamwork, the responsibility rests with managers to organize their staffs in ways that maximize interaction among allied health practitioners and other caregivers. The committee, therefore, recommends that because the problems associated with chronic illness do not fall within the boundaries of any single discipline, administrators and care coordinators in long-term care settings should develop effective means for ensuring that all personnel involved in patient care work closely together to meet patient needs.

Health care managers would be greatly assisted in these endeavors if educators provided the foundation upon which collaborative behavior in later practice could be built. Allied health practitioners need to understand and appreciate the special skills and roles that their fellow allied health workers play along with the assets and limitations of others on the long-term care team.

The issues of recruitment, education, utilization of personnel, and regulation raised throughout this report take on a special significance in the nation's struggle to achieve humane care for its growing numbers of elderly and chronically ill patients. Society will be under great pressure to accommodate larger numbers of patients in the settings we have discussed here. It will also be under at least as great pressure to limit the resources that may be necessary to raise the standard of care. Allied health practitioners caught up in this struggle will be challenged to use their ingenuity both on a personal level as care providers and collectively as an important force for shaping the care system.

The remedies suggested in this chapter are not new. They can be found in the work of current committees and task forces and even in past Institute of Medicine studies on nursing and health care teams (IOM, 1972; IOM, 1983). But the time to move teamwork and geriatric education ahead is long past due.

No single recommendation the committee can devise will accomplish this movement. It must come from health professions leaders willing to concede a measure of control and autonomy in favor of the common goal of collaborative patient care. It will require the ingenuity of educators in seeking additional resources for curriculum reform or the resolve to initiate a painful process of resource allocation that places a higher value on collaboration and preparation for the demands of long-term care.

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APPENDIX I

CONGRESSIONAL MANDATE

Public Law 99-129, Signed October 22, 1985

STUDY OF THE ROLE OF ALLIED HEALTH PERSONNEL IN HEALTH CARE DELIVERY

Sec. 223(a)(1) The Secretary of Health and Human Services shall arrange for the conduct of a study concerning the role of allied health personnel in health care delivery. The Secretary shall request the National Academy of Sciences to conduct the study under an arrangement under which the actual expenses incurred by the Academy in conducting such study will be paid by the Secretary and the Academy will prepare the report required by subsection (c). If the National Academy of Sciences is willing to do so, the Secretary shall enter into such an arrangement with the Academy for the conduct of the study.

(2) If the National Academy of Sciences is unwilling to conduct the study required by paragraph (1) under the type of arrangement described in such paragraph, the Secretary shall enter into a similar arrangement with one or more appropriate nonprofit private entities.

(b) The study required by subsection (a) shall :

(1) assess the role of allied health personnel in health care delivery;

(2) identify projected needs, availability, and requirements of various types of health care delivery systems for each type of allied health personnel;

(3) investigate current practices under which each type of allied health personnel obtain licenses, credentials and accreditation;

(4) assess changes in programs and curricula for the education of allied personnel and in the delivery of services by such personnel which are necessary to meet the needs and requirements identified pursuant to paragraph (2); and

(5) assess the role of the Federal, State, and local governments, educational institutions and health care facilities in meeting the needs and requirements identified pursuant to paragraph (2).

(c) By October 1, 1987, the Secretary of Health and Human Services shall transmit to the Committee on Labor and Human Resources of the Senate and the Committee on Energy and Commerce of the House of Representatives, and make available to the public, a report:

(1) describing the study conducted under this section;

(2) containing a statement of the data obtained under such study; and,

(3) specifying such recommendations for legislation and administrative action as the Secretary considers appropriate.

APPENDIX II

PARITICIPANTS OF WORKSHOPS AND PUBLIC MEETINGS

IOM COMMITTEE TO STUDY THE ROLE OF ALLIED HEALTH PERSONNEL
PUBLIC MEETING

July 1, 1987

American Assoc. of Certified Allied Health Personnel in Ophthalmology
Norma Garber

American Assoc. of Certified Allied Health Personnel in Ophthalmology
Ella Rosamont-Morgan

American Association for Marriage and Family Therapy
Michael Bowers

American Association for Respiratory Care
Mel Martin
President

American Association of Certified Orthoptists
Barbara Chassin

American Association of Certified Orthoptists
Randy Gouterman
Orthopist

American Association of Medical Assistants, Inc.
Don Balasa
Assistant Director

American Cardiology Technologists Association
Stephen Kaniecki
President

American Cardiology Technologists Association
Linda Humston

American College of Cardiology
Francis J. Menapace, Jr., M.D.

American College of Nurse-Midwives
Karen Bodenhorn

American College of Radiology
Marie Zinninger

American College of Radiology
Mark Mishkin, M.D.
Committee on Human Relations

American College of Radiology
Robert Braden

American College of Surgeons
Cindy Brown
Washington Associate

American Dental Association
Louis Schuhrke
Council on Dental Education

American Dental Association
Brenda Harrison
Director, State Government Affairs

American Dental Association
L.P. Wheat
Director, Government Relations

American Dental Association
J. O'Donnell
Director, Legislative Policy

American Dental Hygienists Association
William Schmidt

American Dental Hygienists Association
Diane de Roos Bassage
Second Vice President

American Dietetic Association
Jean Minskoff

American Dietetic Association
Patti Blumer

American Dietetic Association
Bob Earl
Manager, Government Affairs

American Hospital Association
Barabara Kreml
Director, Human Relations

American Medical Record Association
Rita Finngegan
Executive Director

American Medical Technologists
William Robbins
Board of Directors

American Medical Technologists
Eleanor Bors
Executive Director

American Occupational Therapy Association
Susan Scott
Director of Government and Legal Affairs

American Occupational Therapy Association
Stephanie Hoover, Ph.D.

American Occupational Therapy Association
Jeanette Bair
Director, Practice

Amerian Orthotic And Prosthetic Association
General William McCulloch
President

American Orthotic And Prosthetic Association
Charles Unger
Director, AOPA Affairs

American Orthotic and Prosthetic Association
Wilson Latkovic
Assistant Director

American Physical Therapy Association
Frank Mallon
Associate Executive Vice President, Professional Relations

American Physical Therapy Association
Tom Welsh
Chief, Physical Therapy

American Society for Medical Technology
Glenda Price, Ph.D.

American Society for Medical Technology
Sidney Oliver

American Society for Parenteral and Enteral Nutrition
Janet Gannon
Director of Professional Development

American Society for Medical Technologists
Lynn Podell, J.D.
Executive Director

American Society of Allied Health Professions
David Broski, Ph.D.

American Society of Allied Health Professions
Pat Gillespie

American Society of Clinicial Pathologists
Paul Cherney, M.D.
Chairman, ASCP Board of Registry

American Society of Clinical Pathologists
Cathy Cohen

American Society of Clinical Pathologists
Barabara Castleberry, Ph.D.
Vice President

American Society of Clinical Pathologists
Bobbi-Lynn Watnik
Legislative Assistant

American Society of Cytology
Ann H. Clark
Prof. of Cytotechnology, M.U.S.C.

American Society of Cytology
Sally-Beth Buckner

American Society of Electroneurodiagnostic Technologists
Leigh O'Neal
Board of Trustees

American Society of Microbiology
Dieter Groeschel, M.D.
Chairman, Committee on Laboratory Practices for Microbiology

American Speech-Language-Hearing Association
Morgan Downey

American Speech-Language-Hearing Association
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National Society for Cardiopulmonary Technology
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National Society of Allied Health
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Herbert C. Hammond
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Office of the Assistant Secretary for Health, U.S. DHHS
Carol Zucket
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Society of Nuclear Medicine, Technologist Section
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INSTITUTE OF MEDICINE

COMMITTEE TO STUDY THE ROLE OF ALLIED HEALTH PERSONNEL

MEETING OF AUGUST 31 - SEPTEMBER 2, 1987

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INSTITUTE OF MEDICINE

COMMITTEE TO STUDY THE ROLE OF ALLIED HEALTH PERSONNEL

Workshop on Factors That Affect the Demand for Allied Health Personnel

April 26 - 27, 1987

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Appendix III

A SAMPLE OF ALLIED HEALTH JOB TITLES
AND
A CLASSIFICATION OF INSTRUCTIONAL PROGRAMS IN ALLIED HEALTH

A Sample of Allied Health Job Titles
(Taken from the New York City Health and Hospital Corportation)

Clinical Laboratory Technology

- Associate Laboratory Microbiologist
- Chemist (Biochemistry)
- Laboratory Associate
- Laboratory Microbiologist
- Laboratory Technician
- Principal Microbiologist

Dental Services

- Dental Assistant
- Dental Hygienist

Dietetic Services

- Assistant Director of Food Service
- Associate Supervising Dietitian
- Chief Dietitian
- Dietary Aide
- Dietitian

Emergency Medical Services

- Ambulance Technician
- Ambulatory Care Technician
- Emergency Medical Service Specialist

Medical Record Services

- Assistant Director of Medical Records
- Assistant Director, Medical Records Services
- Associate Medical Record Specialist
- Medical Record Specialist
- Senior Medical Records Systems Analyst

Occupational Therapy

- Occupational Therapist

Physical Therapy

- Physical Therapist

Radiological Services

- Nuclear Medicine Technician
- Radiation Technician

Respiratory Therapy

- Respiratory Therapist
- Respiratory Therapy Technician

Speech-Language Pathology/Audiology

- Audiology Clinician
- Speech Clinician
- Staff Audiologist
- Staff Speech Pathologist

Other

- Addiction Counselor
- Addiction Specialist
- Assistant Addiction Counselor
- Assistant Bio-Medical Equipment Technician
- Assistant Community Liaison Worker
- Assistant Supervisor of Recreation
- Bio-Medical Equipment Technician
- Electrocardiograph Technician
- Electroencephalograph Technician
- Medical Equipment Specialist
- Operating Room Technician
- Orthoptist
- Physician Assistant
- Psychiatric Social Health Technician
- Rehabilitation Counselor
- Rehabilitation Technician
- Senior Electrocardiograph Technician

A Classification of Instructional Programs (CIP)
in Allied Health

The Classification of Instructional Programs (CIP), developed by the U.S. Department of Education's Center for Educational Statistics (CES) in 1979-80, was updated for the first time in 1985. CIP is a taxonomy for instructual programs at all levels. It is used in all CES surveys and is the accepted government standard for education information surveys.

17. ALLIED HEALTH

17.01 Dental Services

17.0101	Dental Assisting
17.0102	Dental Hygiene
17.0103	Dental Laboratory Technology
17.0199	Dental Services, Other

17.02 Diagnostic and Treatment Services

17.0201	Cardiovascular Technology
17.0202	Dialysis Technology
17.0203	Electrocardiograph Technology
17.0204	Electroencephalograph Technology
17.0205	Emergency Medical Technology - Ambulance
17.0206	Emergency Medical Technology - Paramedic
17.0207	Medical Radiation Dosimetry
17.0208	Nuclear Medical Technology
17.0209	Radiologic (Medical) Technology
17.0210	Respiratory Therapy Technology
17.0211	Surgical Technology
17.0212	Diagnostic Medical Sonography
17.0299	Diagnostic and Treatment Services, Other

17.03 Medical Laboratory Technologies

17.0301	Blood Bank Technology
17.0302	Chemistry Technology
17.0303	Clinical Animal Technology
17.0304	Clinical Laboratory Aide
17.0305	Clinical Laboratory Assisting
17.0306	Cytotechnology
17.0307	Hematology Technology
17.0308	Histologic Technology
17.0309	Medical Laboratory Technology
17.0310	Medical Technology
17.0311	Microbiology Technology
17.0399	Medical Laboratory Technologies, Other

17.04 Mental Health/Human Services

17.0401	Alcohol/Drug Abuse Specialty
17.0402	Community Health Work
17.0404	Home Health Aide
17.0405	Mental Health/Human Services Assisting
17.0406	Mental Health/Human Services Technology
17.0407	Rehabilitation Counseling
17.0408	Therapeutic Child Care Work
17.0409	Population and Family Planning
17.0410	Sign Language Interpreting
17.0499	Mental Health/Human Serives, Other

17.05 Miscellaneous Allied Health Services

17.0502	Central Supply Technology
17.0503	Medical Assisting
17.0504	Medical Illustrating
17.0505	Medical Office Management
17.0506	Medical Records Technology
17.0507	Pharmacy Assisting
17.0508	Physician Assisting
17.0510	Podiatric Assisting
17.0512	Veterinarian Assisting
17.0513	Health Unit Coordinating
17.0514	Chiropractic Assisting
17.0599	Miscellaneous Allied Health Services, Other

17.06 Nursing-Related Services

17.0601	Geriatric Aide
17.0602	Nursing Assisting
17.0605	Practical Nursing
17.0606	Health Unit Management
17.0699	Nursing-Related Services, Other

17.07 Ophthalmic Services

17.0701	Ophthalmic Dispensing
17.0705	Optometric Technology
17.0799	Ophthalmic Services, Other

17.08 Rehabilitation Services

17.0801	Art Therapy
17.0802	Corrective Therapy
17.0803	Dance Therapy
17.0804	Exercise Physiology
17.0806	Music Therapy
17.0807	Occupational Therapy
17.0808	Occupational Therapy Assisting

17.0809	Occupational Therapy Aide
17.0811	Orthotics/Prosthetics
17.0812	Orthopedic Assisting
17.0813	Physical Therapy
17.0814	Physical Therapy Aide
17.0815	Physical Therapy Assisting
17.0816	Recreational Therapy
17.0817	Recreation Therapy Assisting
17.0818	Respiratory Therapy
17.0819	Respiratory Therapy Assisting
17.0820	Speech/Hearing Therapy Aide
17.0822	Recreational Therapy Aide
17.0899	Rehabilitation Services, Other

17.99 Allied Health, Other

17.9999 Allied Health, Other

Appendix IV

ESTIMATES OF THE CURRENT SUPPLY OF PERSONNEL IN TEN ALLIED HEALTH FIELDS

Making an accurate assessment of the supply of allied health practitioners in each field is not easy. For many fields, no reliable data source exists for either the total number of qualified people, the number working or the number not working but available if the right market conditions occur. The Bureau of Labor Statistics (BLS) uses the Occupational Employment Survey (OES), which collects data on the number of filled jobs. In fields with a high incidence of multiple job holding BLS data are an inaccuarate reflection of the labor force. Another major source of data, the decennial census of the United States, was last conducted in 1980; these data, are now dated, and their definitions of allied health fields often do not match the professions' definitions. A third source of data, professional associations' memberships, may comprise only a small fraction of the supply of practioners. Since not all practitioners are listed as certificate, license, or registration holders and not all listed practitioners are in the active labor force, these also are not always accurate representations of the labor force.

Nevertheless, some estimates of the supply of practitioners can be made. For example, in fields where multiple-job-holders are not common, the BLS data closely approximates the number of people working in the field. Some professional associations collect data on both the number of qualified practitioners and the number of practitioners active in the field.This appendix presents supply estimates derived from various sources of data. Though it is difficult to pinpoint a "best figure," the estimates can be used to map a reasonable range of the number of people working in each of 10 fields.

1. Dietitians

BLS estimated total employment dietician a in 1986 to be 40,201 (38,201 wage and salary jobs and 2,000 self-employed dietitians). The BLS defines dietitians as people who "organize, plan, and conduct food service or nutritional programs to assist in [the] promotion of health and control of disease." Dietitians "may administer activities of a department providing quantity food service", and "may plan, organize, and conduct programs in nutritional research."

The American Hospital Association's 1985 annual survey indicated that there were 14,993 full- and part-time dietitians employed in U.S. registered hospitals that year. BLS estimates that 37 percent of all dietitians were employed in hospitals in 1986. Assuming that the number of dietitians working in hospitals did not change significantly between 1985 and 1986 was roughly equal to AHA's 1985, then extrapolating from the

AHA data (14,933/.37), we estimate that there were about 40,100 dietitians employed in 1986.—confirming the BLS estimate.

The American Dietetic Association reported 44,570 registered active dietitians at the end of 1987.

2. Dental Hygienists

The OES defines dental hygienists as people who "perform dental prophylactic treatments and instruct groups and individuals in the care of the teeth and mouth." BLS estimated that dental hygienist filled 86,676 jobs in 1987—none were self employed. As mentioned earlier, the BLS data pertains to jobs. People who hold more than one job are counted at each job site. Because multiple job holding is common among dental hygienists, the number of dental hygienist jobs filled greatly exceeds the number of working dental hygienists.

The Bureau of Health Professions of the Health Resources and Services Administration estimate that there were 45,800 dental hygienists in 1984 filling an estimated 76,000 jobs. Thus each working hygients filled an average of 1.66 jobs. Assuming the job to hygienist ratio was about the same in 1986 as in 1984, we estimate that there were about 52,200 working hygienists in 1986.

Dental hygienists are licensed in every state and the District of Columbia. To obtain a license, a candidate graduate from a dental hygiene school accredited by the Commission on Dental Accreditation and pass both a written and a clinical examination. According to the Commission's 1986/87 annual report, a total of 51,713 students graduated from accredited schools between 1976 and 1986.

3. Emergency Medical Technicians

BLS estimates that there were 65,229 paid emergency medical technicians (EMTs) in 1986. EMTs, according to the OES survey instrument, "administer first aid treatment and transport sick or injured persons to medical facilities, working as a member of an emergency medical team." EMTs are not ambulance attendants and drivers.

Since there are many volunteer EMTs the number of paid EMTs understates the true supply of practitioners. The 1985 National EMS Clearinghouse survey indicated that approximately 95,000 EMTs are certified annually in 42 States. New York, Texas and California, three of the most populous States, were not among those reporting. Certification is generally valid for two years; we therefore estimate that there are at least 200,000 certified EMTs in the U.S. in any one year.

4. Medical Laboratory Technologists and Technicians

BLS estimates that 239, 350 jobs existed for medical laboratory technologists and technicians in 1986 including 1,000 self-employed persons. The OES defines medical and clinical laboratory technologists as people who "perform a wide range of complex procedures in the general areas of the clinical laboratory or perform specialized procedures in such areas as cytology, histology, and microbiology." Their "duties may include supervising and coordinating activities of workers engaged in laboratory testing and include workers who teach medical technology when teaching is not their primary activity." Medical and clinical laboratory technicians are defined as persons who "perform routine tests in medical laboratories for use in treatment and diagnosis of disease." They "prepare vaccines, biologicals, and serums for prevention of disease" and "prepare tissue samples for pathologists, take blood samples, and execute such laboratory tests as urinalysis and blood counts." Laboratory technicians "may work under the general supervision of a medical laboratory technologist." Although BLS collects separate data for the two categories of laboratory personnel, the data is combined for reporting purposes.

It is difficult to estimate the average ratio of technologists to technicians. Of the 209,000 registrants of the Amercian Society of Clinical Pathologists 82 percent were medical technologist in 1987. The registery of the National Certification Agency for Medical Laboratory Personnel was comprised of 83 percent technologists and 17 percent technicians in September 1987. If the above ratios are applied to the BLS estimate of total employment of medical laboratory technologists and technicians, the numbers of technologists and technicians in the workforce in 1986 would have been about 196,267 and 43,083 respectively. A word of caution. Technicians may be less likely than technologists to be certified, thus our estimate may underrepresent technicians and overrepresent technologists. Unfortunately, there is no easy way to verify the ratio of technicians to technologist.

5. Medical Record Administrators and Technicians

BLS does not estimate total employment for medical record administrators (MRAs).

The AHA 1985 annual survey shows 7,639 full- and part-time medical record administrators employed in U.S. registered hospitals in that year. If, as indicated by the American Record Association (AMRA) 1986 membership survey, approximately 73 percent of all MRAs work in acute care facilities then (extrapolating from the AHA data) the total number of persons employed as medical record administrators would be 10,464. If this is the case over 20 percent of people filling MRA jobs are unregistered since AMRA reported only 8,240 registered medical record administators in 1987.

Employment of medical record technicians (MRT) was estimated by BLS to be 39,888 in 1986. The OES survey, defines MRTs as persons who "compile and maintain medical records of hospital and clinic patients." AMRA reported 14,690 accredited record technicians (ARTs) in 1987.

The AHA 1985 annual survey shows 43,383 full- and part-time medical record technicians employed in U.S. registered hospitals. This is not only substantially higher than the BLS estimate of 24,500 jobs in hospitals, but also higher than the BLS estimate of total technicians' jobs in all settings. The reasons for this difference is unknown but may be sought in an examination of the ways in which job definitions are developed, and interpreted by survey respondents.

6. Occupational Therapists

The BLS estimates that 29,355 jobs for occupational therapists existed in 1985. The OES defines occupational therapists as persons who "plan, organize, and participate in medically oriented occupational programs in hospitals or similar institutions to rehabilitate patients who are physically or mentally ill."

The AHA 1985 annual survey shows 10,595 full- and part-time occupational therapists employed in U.S. registered hospitals. The American Occupational Therapy Association (AOTA) reports that about 28 percent of its members worked in general and pediatric hospitals in 1986. BLS estimates that 32.5 percent of total employment is in hospitals.

Total active membership of registered occupational therapists in the AOTA was about 27,300 at the end of 1987. Until mid-1987 registered occupational therapists automatically became members of the AOTA, and the tally of active members represented about 99 percent of the professional workforce. Membership in the association is now voluntary.

7. Physical Therapists

Total employment of physical therapists in 1986 was estimated by BLS to be about 61,168, including 5,000 self-employed persons. The OES defines physical therapists as persons who "apply techniques and treatments that help relieve pain, increase the patient's strength, and decrease or prevent deformity and crippling."

The American Physical Therapy Association (APTA) estimated the number of licensed physical therapists to be 65,890 as of June 1986. All states require practicing professional physical therapists to be licensed.

8a. Radiologic Technologists and Technicians

The BLS estimates that 115,429 jobs for radiologic technologists and technicians existed 1986. The OES defines radiologic technologists as persons who "take x-rays, cat scans, or administer non-radioactive materials into patient's blood stream for diagnostic and therapeutic purposes." Hospitals were asked to include in the category of radiologic technologist workers whose primary duties were to demonstrate portions of the human body on x-ray film or fluoroscopic screens. Radiologic technicians were defined as persons who "maintain and safely use equipment and supplies necessary to demonstrate portions of the human body on x-ray film or a fluoroscopic screen for diagnostic purposes." Included in the BLS "radiologic technologists and technicians" category are radiation therapists and sonographers. Nuclear medicine technicians are not included.

The Bureau of Health Professions estimates that there were 143,000 radiologic health service workers of all types in 1986, including nuclear medicine technologists.

8b. Nuclear Medicine Technologists

Nuclear medicine technologists "prepare, administer, and measure radioactive isotopes in therapeutic, diagnostic, and tracer studies utilizing a variety of radioisotope equipment." They "prepare stock solutions of radioactive materials and calculate doses to be administered by radiologists." They "subject patients to radiation [and] execute blood volume, red cell survival and fat absorption studies following standard laboratory techniques."

BLS estimates that there were 9,677 nuclear medicine technologist jobs in 1986, of which 89 percent were in hospitals. Over 88 percent of the respondents to a 1987 survey conducted by the Nuclear Medicine Technology Certification Board indicated that they work in a hospital.

The 1985 AHA survey of U.S. hospital indicated that there were 7,972 full- and part-time nuclear medicine technologists employed in U.S. registered hospitals in that year. If about 89 percent of all nuclear medicine technologists work in hospitals, the AHA data suggests that the total number of nuclear medicine technologists employed in 1985 was about 9,000, which is close agreement with the BLS estimate. The NMT Certification Board reported 10,298 certified technologists in August 1987.

9. Respiratory Therapists

BLS estimated that 56,333 jobs for respiratory therapists existed in 1986 — there were no self employed respiratory therapists. The OES defines respiratory therapists as persons who "set up and operate various types of equipment, such as iron lungs, oxygen tents, resuscitators, and incubators, to administer oxygen and other gases to patients."

The 1985 AHA survey indicated that there were 32,623 respiratory therapists employed in US registered hospitals in that year. The American Association for Respiratory Care (AARC) states that the majority of respiratory care practitioners work in hospitals. BLS estimates that 88 percent of such jobs are to be found in hospitals.

10. Speech Pathologists and Audiologists

The BLS estimates that jobs for speech pathologists and audiologists numbered 45,129 in 1986, including 3,000 self-employed practitioners. The OES survey defined speech pathologists and audiologists as health care practitioners who "examine and provide remedial services for persons with speech and hearing disorders and perform research related to speech and language problems."

The 1985 AHA survey identified 5,354 speech pathologists and audiologists employed in US registered hospitals in that year. If, as the BLS states, hospitals provide only about ten percent of total employment for speech pathologists and audiologists the total number of speech pathologists and audiologists employed in 1985 would have been about 53,540—substantially higher than the BLS estimate

56,287 speech pathologists and audiologists are certified by The American Speech-Language-Hearing Association. Ninety-two percent of certified practitioners, are ASHA members. Although basic occupational preparation is at the master's level, persons holding only a bachelor's degree in speech pathology and audiology are employed in some settings and may be considered a part of the labor supply. There is no estimate how many bachelor's-level practitioners exist.

Appendix V

PROJECTIONS OF DEMAND AND SUPPLY IN OCCUPATIONS

This appendix describes the purposes for which projections of demand and supply of workers are made and the characteristics these projections must have if they are to serve their purpose. The various methods that have been used for making projections are summarized and the limitations of each is discussed. The accuracy and limitations of the methods used by the Bureau of Labor Statistics are discussed. A final section points to needed research needed and suggests how the projections can best be understood and used.

Purposes of Projections

Economic history amply demonstrates the rise and fall of industries and of occupations. Fluctuations in supply is most likely in occupations requiring long training periods, since it may take years for supply responding to market signals to get through the educational pipeline. Workers investing time and money in education, employers concerned about the availability of skilled workers, and a public interested in stability of wages and prices and in getting services when they are needed all have an interest in our ability to anticipate changes in employment at least a few years in the future.

Projections may be made for a variety of purposes, among which are the following:

o Evaluating the adequacy of training or education programs in the light of potential need for workers.

o Estimating the feasibility of major proposed programs for government expenditure (such as defense, public works, or facilities) in terms of the availability of skilled workers to accomplish or staff them.

o Providing information on future employment opportunities for the guidance of individuals choosing courses of education or training.

Examples of the first of these include the insistence of the Congress that federally supported programs of vocational education and for training of the unemployed or the disadvantaged be planned with future employment opportunities in mind. Similarly, the Congressional consideration of programs such as highway construction, community mental health facilities, and the Special Defense Initiative ("Star Wars") programs — to name a few — included inquiring about the availability of the highly skilled personnel required. The Bureau of Labor Statistics launched its occupational outlook research program in 1940 in response to the guidance profession's concern that your people have adequate information by which to choose among careers; the same motivation is behind the efforts of state governments to provide local projections of employment growth by occupation.

The rationale and assumptions underlying the projections may differ depending on their purposes. Both vocational guidance and evaluating the adequacy of training programs to meet future needs for skilled workers call for a realistic estimate of future economic demand in the occupation. Estimating the manpower feasibility of proposed programs, on the other hand, calls for the translation of the program goals — whether or not they are realistic — into personnel, and adding to these requirements a realistic estimate of the demand for the same types of workers in the rest of the economy.

On the supply side, for vocational guidance purposes projections of the most probable supply in comparison with the economic demand give the best picture of future employment opportunities and the competitive situation in each field. For evaluating the feasibility of a proposed program a forecast of the most probable supply is also desirable; it would show whether the program can be accomplished without special measures to attract more workers to the field. For appraisals of the adequacy of present training programs, on the other hand, a major element of the estimate of future supply — the number of trainees — is the quantity for which the exercise is undertaken, the "X" in the equation, and there is no need to estimate it independently. One way to look at the supply, an approach particularly useful in evaluating whether the number of training slots is adequate to meet the demand, is to treat the losses to the occupation resulting from death, retirements, and net mobility to other occupations as components of "replacement needs", to be added to the estimated growth of the occupation to get the total demand that has to be satisfied by the flow of trainees.

In all the above we have discussed supply and demand as if they were independent of each other, when in fact they are interdependent. An increase in demand, by raising wage rates, elicits an increase in supply; and supply also affects demand through its effects on wages and costs. Only when there are constraints on demand such as those imposed by the technology of an industry (a steel mill can't employ pastry cooks to roll steel), or constraints on supply, such as limited educational facilities or licensure, is the adjustment of demand and supply impeded.

In those occupations requiring long periods of education or training, however, it may take several years for the signal of an increase in demand to fill the educational pipeline and produce an increase in graduates; it is for these occupations that projections are particularly useful in facilitating adjustment of demand and supply. In the absence of projections young people have only the current market situation to guide them, if they react strongly to a current shortage of graduates and high salary offers they find that when they graduate, four years later, the field is overcrowded, and salaries drop, causing the current year's entrants to avoid the field and precipitating a shortage four years later. (The operation of "cobweb" patterns in the labor markets for highly trained workers is demonstrated in a number of papers by Richard Freeman.)

Projection Methods

A variety of methods for projecting demand and supply have been tried.

The simplest has been to ask employers how many workers they expect to employ in the future. This method appeals to many people as straightforward and a way of taping the expert knowledge of the people who will make the decisions. Yet it has produced such poor results that, after years of use, it was abandoned early in the 1970's. It was found that few employers make the projections of their sales and technological changes in their industries that would be required to develop good estimates of their future occupational requirements; most don't reply to the surveys or give casual, off-the-cuff answers. There is some tendency for each firm to assume it will gain a larger market share; and an offsetting tendency for companies to report that their personnel requirements five years ahead will be the same as now. Finally, this method makes no allowance for employment in new firms, which, according to some research, are a major provider of additional employment.

A second method that has been used is to extrapolate the past employment trend in the occupation. This is justified on the basis that whatever factors have operated in the past will continue. Unfortunately, history is full of instances when the situation changed, as any buggy whip manufacturer will attest. Another deficiency of this method is its treating the occupation as if it were in a vacuum, unrelated to other events in the economy and in society. This is illustrated by the attempt in the early 1950's to extrapolate the growth of the engineering profession by assuming that the exponential growth it had shown would continue; in a short time the engineers would have exceeded the total labor force, leaving no draftsmen to make the engineers' drawings, no bookkeepers to pay their salaries, and no trash collectors to haul away their beer cans.

A more sophisticated approach has been to associate the growth of an occupation with causative variables that can themselves be projected independently. Projections of the population by age have been used, for example, to project the demand for teachers; the pupils in elementary grades six years hence have already been born, as have high school students fourteen years hence. Changes in pupil-teacher ratios or other strategic variables can be used to modify the results of these projections. Similar methods have been used to project the demand for physicians (GMENAC) and nurses (WICHE). In some cases regression analysis has been used to measure the relative effects of the variables on the result — the projection of employment.

This method may be used to yield estimates of the need for workers in the occupation, rather than the economic demand. If the relevant ratios (such as the pupil-teacher ratio in the projection of employment for teachers) are set at an ideal level in line with what experts in the field consider optimum, the resultant projections can be viewed as projections of need. To the extent that they are based on current ratios which in turn reflect the current market situation, or if they are adjusted for the future to reflect expected changes in the market situation, the resultant estimate will be closer to an estimate of demand. Each approach serves a different purpose.

The advantages of this approach over the simple extrapolation of past trends are obvious. It attempts to take into account some of the strategic factors affecting employment. It is not easy to take into account all the relevant factors, however; demand in an occupation may be affected by technological changes, market changes, the way consumers spend their money and the amount of income they have to spend, government expenditures on education, health, highways, and military material, and the capital expenditures of industry. More than this, the context of the growth of related occupations and industries, and the entire interwoven structure of the economy and of society. When one thinks about the factors affecting employment in health occupation, for example, the importance of population trends, social trends, income and expenditure patterns, the science and technology of medical practice, the financing of medical care, training and licensure, and the growth and attractiveness of alternative occupations all combine to make it apparent that a comprehensive approach is called for.

The Bureau of Labor Statistics, which began its research in this area in 1940 and issued its first occupational projection five years later, at first tried the approach of studying individual occupations, but concluded that a comprehensive analysis was needed. With support from the Veterans' Administration which wanted information to help in the vocational choices of the millions who studied under the World War I G.I. Bill, BLS published outlook information on hundreds of occupations beginning with the first Occupational Outlook Handbook in 1949. The Handbook has been a biennial publication since the mid-fifties.

The broad occupational coverage, frequent publication, and wide use of the projections (150,000 copies of each edition of the Handbook are bought by high schools, colleges, libraries and community agencies) have had important implication for the research program. Spreading research costs over so many occupations has made possible a more comprehensive approach than could be supported if the interest were only in a few occupations. The continuing research effort has led to accumulating experience, deepening knowledge of each occupation, and ongoing contacts with industry, professional organizations, unions and research institute familiar with each field. It has also made possible regular appraisals of the accuracy of the projections and analyses of reasons for errors. As a result of this experience new research programs and data collection systems have been instituted; examples are the occupational employment statistics program begun in the early 1970's, and research on tables of working life and on how people move from one occupation to another to get insight on some of the elements of supply. Over nearly five decades of experience methods have been changed and improved. The wide publication of the results has assured that industry and professional groups in each occupation have cooperated with the Bureau in giving information and carefully reviewing drafts. use in schools and in vocational guidance undoubtedly influences the perceptions of students about employment opportunities and the occupational choices they make.

The basic approach followed is to estimate the employment in each occupation that will be generated by economic demand. This goes back to the demand for the goods or services the occupation provides, and this in turn is affected by the total spendable income available to consumers and governments and to the changing patterns of what they spend it on. These are influenced by a wide variety of social and economic factors, including changing tastes and styles, scientific discoveries and technological change affecting both what is produced and how it is produced, the growth and changing composition of the population, taxation and government expenditures policies ("guns or butter"), and what other countries are buying from and selling to us.

This is a tall order, and guessing what will happen in the future on so many different fronts is hazardous. Natural disasters, social cataclysms and business cycles are hard to predict. But some of the changing factors move relatively slowly: there are lags between scientific discovery and commercial exploitation of the new technology, between the initiation of a new style and its widespread adoption, between the first Japanese automobile sold in the United States and the subsequent market success. This means that if projections are confined to a relatively short time horizon (about ten years is enough to guide educational policy and the career choices of individuals), if sets of alternative projections are made to show the effect, for example, of alternative assumptions as to the state of the economy or the business cycle, if events are constantly monitored, if the projections are revised at frequent intervals, and if continuous research is carried out on the accuracy of the projections and on the adequacy of the methods, there will be a good chance that useful projections can be produced.

The Bureau of Labor Statistics projections start with the population projection made by Census Bureau demographers. This gives the numbers of consumers and serves as a basis for projections of the labor force by BLS on the basis of the trends in labor force participation by each age, sex, and race group. From the total human resources thus projected, BLS estimates the gross national product that will be generated, by making assumptions as to the growth of output per workers, changing hours of work, and the level of unemployment that has to be allowed for. To provide for the uncertainties of the business cycle and to suggest the range of error to users of the projections, three sets of projections are usually made, depicting a "high", a "moderate", and a "low" forecast; the assumptions as to productivity, hours and unemployment are adjusted to yield an estimate of GNP growth under these three conditions.

From the above bare recital of an elaborate process one may get the impression of a mechanical juggernaut grinding roughshod over the entire economy of 110 million people, in all its complexity, nuances, and infinite variety, and mashing up the professions we are interested in with masses of coal miners, factory workers and fast food slingers. What has not been said is that at each step special knowledge is introduced whenever it is available, and the factors entering into the calculations are adjusted on the basis of information on developing and newly emerging trends in the industry. In the most recent projections, for example, projections for the mining industries take into account the latest petroleum import analyses for the target year from the Department of Energy. Projections for the machinery and computer manufacturing industries incorporate analyses of the market situation and foreign competition. Projections for health services consider such developments as cost containment policies, and shift of many surgical procedures to doctors' offices and outpatient facilities, growth of new group practices and nursing and personal care facilities, and the aging of the population. The Bureau's extensive research program on productivity and technological development yields insights as to the growth of overall productivity, of productivity in each industry, and the technological developments affecting the numbers and kinds of occupations employed. The advantage of the comprehensive interactive approach is that special information or analyses on any aspect of the complex economy can be inserted and the implications, not only for a particular occupation on industry but for all others, can be drawn.

On the supply side, in contrast, there is no unifying and systematic method for projections. The supply of workers in an occupation if affected by the inflow of trainees and of persons who acquire the necessary skills by experience or work in related occupations or by study of related subjects, and the outflow of persons retiring, dropping out of the labor force temporarily, dying, or transferring to other occupations. The supply is, of course, affected by relative wages in this and other occupations available to the workers.

Projections of the number of college graduates in each field have been published by the Department of Education; these were based on the projected population of the appropriate age and mathematical extrapolation of trends in the proportion of the population completing college. The total degrees were distributed by field (college majors) by mathematical extrapolation of past trends. Since there was no attempt to take into account the effects of social and market factors on the decisions of young people (except insofar as these factors were embodied in the past trends projected) they cannot be considered realistic. They do, however, serve a useful purpose: they can be used to illustrate what would happen to the outflow of graduates, an important component of the supply, if nothing happened to change the choices people make. If such estimates are compared to independent estimates of future demand or the requirements for attaining some national goal such as a proposed community mental health program, a disparity between the projected demand and the projected supply could point to policy measures required to attain the goals, such as scholarships or other inducements to take training for the occupations.

To get a handle on the outflows and inflows affecting occupational supply, the BLS has pursued a number of avenues of research. To estimate losses resulting from deaths and retirements, tables of working life (similar to life tables) were developed, showing the annual attrition to a population at each age. These age-specific rates were applied to the age composition of each occupation to estimate annual losses. These, however, take no account of differences in work life patterns among occupations, nor of losses resulting from transfers to other occupations. More recently studies have been made of transfers into and out of occupations (Eck, 1984) and more complete attrition rates for each occupation have been estimated, including shifts into unemployment and withdrawal from the labor force (either retirement or temporary withdrawal).

The BLS does not make projections of supply in occupations. It does publish estimates of annual attrition or replacement rates. This information is offered, together with the projected rate of growth in each occupation and information on the unemployment rate, as clues to the employment opportunities in the occupation. The inclusion of information on replacement rates makes clear the point that projected growth alone does not tell the whole story about employment opportunities.

Projections of employment demand for more than 300 occupations are published in technical articles and bulletins. (The most recent projections of general economic growth, industrial growth and occupations were published in the Monthly Labor Review for September 1987). Brief articles on each of about 200 occupations involving relatively long periods of training are published in the Occupational Outlook Handbook, and profiles of the basic numbers — employment, projected employment growth, unemployment rates, replacement rates, and numbers completing training in a recent year — for about the same number of occupations are published in a series of bulletins called Occupational Projections and Training Data, of which the most recent issue was in 1984 (BLS Bulletin 2206).

State and Local Projections

In most states projections for the state and major geographic areas within the state are made by state agencies, most commonly employment security agencies, but sometimes universities or other economic analysis organizations. Until a few years ago there was a cooperative federal-state relationship in this work, with the Bureau of Labor Statistics providing technical consulting and sometimes tabulation work, but this was dropped as a result of budget cuts. The states continue to work, however. The National Occupational Information Coordinating Committee, composed of representatives of the Departments of Labor and Education, and its affiliated state occupational information coordinating committees give leadership to these efforts.

The methods they follow differ, but have a few elements in common. The national projections of growth of industries are generally taken as a framework, and the past changes in each state's share of national employment in the industry, together with projections of the state's population, and any input from the economic development agency of the state are used to project the industry's growth locally. Industry occupational composition data from the Occupational Employment Survey (which is conducted by the state agencies in cooperation with BLS) are used to project employment by occupation. Replacement rates provided by the BLS are also published.

Evaluation of BLS Projections and Methods

An evaluation of the methods should begin with a look at the scorecard;how accurate the projections have been. The Bureau of Labor Statistics has published a number of evaluations of the accuracy of its projections, comparing them to the actual employment in each industry and occupation when the target year's statistics became available. We will refer to the two most recent evaluations, those for the 1960-1975 projections (Carey, 1980) and the 1970-1980 projections (Carey and Kasunic, 1982). (No more recent evaluations have been published, in part because changes in the classification system for occupations have made it difficult to compare earlier projections with current employment data since 1983.)

Comparing a projection that purports to reflect demand, without regard to supply, with the actual employment in the target year is not entirely logical. It is justified only if one can assume that the supply will come forward to match the demand, which does not always happen.

There are a number of ways to look at the accuracy of projections. One is to compare the number of workers employed in the target year with the number projected. The purpose of the projections, however, is to anticipate change, to distinguish occupations growing rapidly and slowly, and especially to do the more difficult task of identifying occupations that shrink while the economy as a whole is growing. Our evaluation will therefore concentrate on how well the rate and direction of change in employment was projected.

To begin with one should look at the degree of variabilty in growth rates among occupations, to see what the forecaster is up against. If growth rates vary in a narrow range around the average we should expect projections to come close; if they are widely dispersed, the projections may be judged by more lenient standards. The following table arrays the actual changes in employment in occupations included in the two BLS evaluation studies referred to according to broad groupings of their rates and directions of change as compared to the average change for all occupations.

Growth Rates in Employment in Occupations

	1960-1975	1970-1985
Average (weighted) change for all occupations	32.6%	28.9%
Total number of occupations compared	76	64
Occupations with:		
Declines in employment	16	20
Increases in employment	60	44
Below average (more than 10 percentage points below the average)	11	10
About average (within 10 percentage points above or below the average)	17	9
Somewhat above the average (between 10 percentage points above the average and twice the average)	11	11
Twice to triple the average	11	5
More than triple the average	10	9

This little table could well have been made the preface of this paper: it powerfully demonstrates the variability of occupational change, the risk undertaken by anyone who invests in long and expensive training for an occupation, and the difficulties the forecaster is up against. In a ten or fifteen year period when the average occupation grew by about 30 percent, between one-fifth and one-third of the occupations actually declines in employment. The number of occupations that grew at a rate triple the average was about the same as the number that grew less than the average. There was virtually no clustering around the average. Obviously occupations are highly volatile in their employment and subject to diverse economic forces.

An evaluation of how well the BLS projections for these occupations succeeded in predicting the actual changes shown above (Goldstein, 1983) concluded that, first, users of the projections had some warning of the declines: five of the 16 that declined from 1960 to 1975 had been predicted to decline, and small increases of less than the average had been predicted for the other 11. In the 1970-1980 period, six of the 20 occupations that declined had been projected to decline, and small increases of less than the average had been projected for seven more.

Second, did the projections identify the occupations that were growing vary rapidly and needed special attention in planning training programs? In the first period, 21 occupations grew at more than twice the average rate; 15 of them had been projected to grow that fast. In the second period, 14 occupations grew at more than twice the average rate, but only two of them had been projected to grow that fast.

Taking all the projections, how close did they come to the actual employment changes? Going back to the class intervals shown in the table above, we may say that if the predicted change was in the same interval as the actual change it was on target. For the first period, 40 percent of the predictions were on target, for the second, 33 percent. If we consider that if the predictions were in the class intervals adjacent to the actual change they were reasonably close, we find that 40 percent of the predictions in the first period and 27 percent of those in the second period were reasonably close. By these standards, perhaps somewhat lenient, but with leniency justified by the variability of economic employment changes, we get 80 percent of the projections in the first period and 60 percent in the second period either on target or reasonably close.

Were the errors biased so that projections were consistently too high or too low? Of all the projections in the first period that were not on target one-third were too low; in the second period roughly half. So there is some evidence of a pessimistic bias in the first period.

One question the IOM committee staff on this project needs to ask is, how well the method predicts the growth of the occupations in which it is interested, the allied health professions. It is a reasonable hypothesis that the economic, technological, social and institutional factors peculiar to the health industry and its occupations may make the general projection method used by the BLS inappropriate to this field.

The evaluation studies we have cited do not include many of the allied health professions, largely because they included only occupations for which the statistics were comparable over the ten or fifteen year spans between the original projections and the the target years; for allied health professions, with their dynamic changes over recent decades, the data needed for comparison are not available. But we can test the hypothesis of peculiarity with evaluations of the accuracy of the projections for other health occupations.

The following table shows the projected and actual employment changes in percents from 1960 to 1975 for six health occupations:

	Projected	Actual
Nurses, professional	73.5	68.5
Dieticians and nutritinoists	35.1	44.6
Optometrists	17.6	10.0
Attendants, hosptial and other institutions	140.7	122.4
Dentists	43.8	23.1
Physicians, medical and osteopathic	66.7	40.2

For the 1970 to 1980 period we have:

	Projected	Actual
Optometrists	20.0	19.4
Osteopaths	43.7	39.3
Physicians and surgeons	48.5	43.3
Registered nurses	42.7	59.9
Dentists	32.0	22.3

It appears that the projections captured the general magnitude of the employment changes in these fields rather better than they did for all the occupations evaluated above, although one could wish for more accurate projections for dentists and physicians in the first period, and for nurses in the second. From this, the hypothesis of peculiarity of the health fields is not supported.

Let us turn to some of the aspects of the projection method that raise questions or present problems.

Demand or Requirements?

In traditional economic analysis demand and supply are equated at a price or wage; but there is no explicit evidence of this in the BLS projection methods. Instead, the employment estimates for future years may be seen as requirements generated by the levels of production or services that the projected economic changes will give rise to. (Indeed, changing relative prices throughout the system could change the economic relationship projected, as for example in tracing the demand for raw materials generated by production of finished goods. However, the adjustments made at various steps in the process to introduce technological change and changes in markets and foreign trade have the effect of inserting price and market changes into the system.)

At the end of the process there is indeed no systematic attempt to modify the employment estimates for each occupation by consideration of supply. Lacking projections of supply, this cannot be done. The projections of occupational employment will be consistent with actual employment in the target year only if the supply of trained workers (perhaps forewarned by publication of the estimates or, in the 1960's responding to policy measures designed to raise supply to meet increased demand resulting from new entitlement programs) adjusts to the employer's requirements. While not true estimates of demand in the sense of traditional economic concepts, the projections do, however, come close to the goal of a realistic estimate of the number of jobs that will be offered, as distinct, for example, from an estimate of ideal needs.

Occupational Composition of Industries

The evaluations of the accuracy of the projections made by the BLS staff concluded that the industries' total employment was more accurately projected than was employment by occupation. From the foregoing discussion we might suspect that the lower accuracy of occupational projections may have resulted from the fact that the demand had not yet been confronted with the supply, and if it had, a different level of employment would have emerged.

Lower accuracy could also have resulted from the quality of the occupational data; until recently the only reasonably complete source of data on the occupational composition of each industry was the decennial census of population. In household surveys such as censuses people report their occupation by whatever name they have to describe it and tell the census enumerator briefly what activities they perform. These reports are classified by census clerks into the 400 or so occupations the census tabulates. There is potential error first in the respondent's report:

some people overstate their occupational status, as is evident from independent data. Second, the census clerks do not always have enough information to classify the occupations correctly; terminology varies across the country. (The same comments apply to another source of occupational employment data, the Current Population Survey, conducted by the Census Bureau. The PPS occupational estimates, based on a smaller sample than those in the population census have larger sampling errors and somewhat less occupational detail is published, but they are available annually).

To improve the accuracy of occupational composition data, the BLS initiated an Occupational Employment Statistics survey, in cooperation with state agencies early in the 1970's. Employment by occupation is collected from employers by means of a separate questionnaire for each industry, listing the occupations found in that industry, with brief definitions that have been worked out in consultation with employers, to assure understanding and ability to report accurately. The sample plants in the survey is chosen to represent all size classes in the industry and to yield accurate estimates.

The survey is limited to wage and salary workers in each industry; the self-employed are added in each occupation by BLS, using data from the Current Population Survey.

Since it is based on reports from employers, the OES counts each workers more than once if he or she has more than one job at a time. This introduces a small inaccuracy in the occupation employment estimates; in the series of surveys of dual job-holding that was made from 1958 to 1980 the number of persons with more than one job averaged about five percent of the total employed — six percent fro men and three percent for women.

The estimates count workers whether they work full-time or part-time, and do not distinguish. This means that in any occupation there could be many part-time workers in the figures. In 1986, 18.7 percent of all persons at work were working part-time — 5.3 percent for economic reason (no full-time work available or they had been temporarily on part-time) and 13.4 percent voluntarily because they preferred part-time work. There is more part-time work among women — 27.5 percent were on part-time, 6.5 percent for economic reasons and 21.0 percent voluntarily. The incidence of part-time work varies among occupations: in the occupation group "technicians and related support personnel" in which many allied health professions are included, 12.9 percent were part-time (2.2 percent economic), and among women technicians 20 percent were on part-time, 3.4 percent economic. (Data from the Current Population Survey.) There are therefore fewer full-time equivalent jobs than the number employed in an occupation implies; employers and workers have adapted to this.

The definitions of each occupation worked out for the OES were, as noted above, designed in cooperation with employers to facilitate reporting. They have to be both understood within the culture of each industry and consistent across industries so that the employment estimates for each occupation are additive. This may not always provide the nuances in definition that professional societies, concerned about qualifications, licensure and similar matters, would like to have. A list of the allied health occupations and related occupation definitions is attached.

We have suggested two reasons for the lower degree of accuracy of the occupational employment projections compared with those for industry employment — that the demand projections are not tested against occupational supply, and that the basic data on occupational composition of industries used in the past projections was inaccurate. We should consider a third reason: that they way in which occupational composition is changing is not well understood and the adjustments inserted into the system to allow for the effects of technological and other changes are not adequate.

The theory underlying the use of occupational composition data in forecasts is that the technology of each industry and the way it does its business calls for a unique mix of occupations. In a gross sense this is certainly true: pastry cooks are not employed in steel rolling mills. But there could be differences among plants in the same industry resulting from differences in process, in equipment, in the way the work is organized, in the local supply of trained workers and the extent to which less-trained workers are substituted for them. For those familiar with hospitals and other health service institutions there is no need to belabor the point that occupational composition may differ from one to another for many reasons.

When the acting commissioner of the Bureau of Labor Statistics first testified before Congress on the request for funds to do occupational outlook research he said he would look at the occupational composition of the technologically most advanced plants in each industry to get clues as to the way composition would be changing. Now, nearly a half century later, this kind of analysis is made possible for the first time by the OES. Not only are the occupation statistics better, but the collection of reports from individual plants offers the potential, never before available except from a few industry wage surveys, for analysis of why the occupational composition differs among plants in the same industry, and how it is affected by size of plant and new technology — analyses that may lead to better projections of occupational employment.

Staffing of the Projections Research

The BLS occupational outlook research staff has been reduced over the past few years as a result of budget cuts, and the burden on individual staff members therefore increased. With some 200 occupations to cover with articles in the Occupational Outlook Handbook, they are spread thin. Nevertheless, when the National Academy of Science staff visited them to discuss their projections, it was found that no fewer than four economists were working on health occupations. They were in touch with developments in their fields and in the health care industry generally, and familiar with issues and the findings of recent studies.

Conclusion: Use of The Projections and Further Research Needs

It should be apparent that forecasting for years in advance is hazardous, and this especially applies to employment by occupation. While there is hope the data and methods will improve in the future, at best the degree of error will be reduced somewhat. The user of projections has to keep this in mind and to take them as only rough indications of the direction and general magnitude of changes.

Of the projection methods we have reviewed, that of the Bureau of Labor Statistics appears to be the best in its ability to take into account a multiplicity of factors. They have been at it long and continuously; they have accumulated experience, knowledge and contacts in each field; they check their errors and are innovative in improving data and methods.

For looking ahead in the allied health profession the Institute of Medicine committee would be well advised to build on the work BLS has done — not necessarily to accept the projections without question, but to take advantage of the analysis of the framework of the U.S. economy within which the health industry operates, and to examine the assumptions and judgments made by BLS staff in the health fields and, if necessary, modify the results for NAS use. Our discussions with the BLS staff made it clear that they are earnestly searching for understanding and would welcome any insights that would improve their projections.

Before we can have any assurance that the supply can be understood or projected more research need to be done on occupational mobility and the factors determining how people shift among occupations. The same may be said about the factors affecting occupational choice.

On the demand side, the weakest link has been in converting projections of employment by industry, which had a fair degree of accuracy, into projections by occupation. Analysis of the factors affecting the occupational composition patterns of industries can now be done since for the first time we have occupational data for individual plants.

The practice of the BLS in publishing its projections has been to issue only 10-year or longer projections, without the intermediate years. yet the latter are likely to be more accurate, since they are closer to what we now know, and they are useful for many purposes. They also lend themselves to more frequent evaluation of accuracy, which would enable the BLS to correct the more distant projections.

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Appendix VI

MINNESOTA SUNRISE PROVISIONS

Minnesota Statute 214 (enacted 1976), Section 214.001.

Subdivision 1. The legislature finds that the interests of the people of the state are served by the regulation of certain occupations. The legislature further finds: (1) that it is desirable for boards composed primarily of members of the occupations so regulated to be charged with formulating the policies and standards governing the occupation; (2) that economical and efficient administration of the regulation activities can be achieved through the provision of administrative services by departments of state government; and (3) that procedural fairness in the disciplining of persons regulated by the boards requires a separation of the investigative and prosecutorial functions from the board's judicial responsibility.

Subdivision 2. Criteria for regulation. The legislature declares that no regulation shall be imposed upon any occupation unless required for the safety and well being of the citizens of the state. In evaluating whether an occupation shall be regulated, the following factors shall be considered:

(a) Whether the unregulated practice of an occupation may harm or endanger the health, safety and welfare of citizens of the state and whether the potential for harm is recognizable and not remote;

(b) Whether the practice of an occupation requires specialized skill or training and whether the public needs and will benefit by assurances of initial and continuing occupational ability;

(c) Whether the citizens of this state are or may be effectively protected by other means;

(d) Whether the overall cost effectiveness and economic impact would be positive for citizens of the state.

Subdivision 3. If the legislature finds after evaluation of the factors identified in subdivision 2 that it is necessary to regulate an occupation not heretofore credentialed or regulated, then regulation should be implemented consistent with the policy of this section, in modes in the following order:

(a) Creation or extension of common law or statutory causes of civil action, and the creation or extension of criminal prohibitions;

(b) Imposition of inspection requirements and the ability to enforce violations by injunctive relief in the courts;

(c) Implementation of a system of registration whereby practitioners who will be the only persons permitted to use a designated title are listed on an official roster after having met predetermined qualifications [note that legislative action is not required here]; or

(d) Implementation of a system of licensing whereby a practitioner must receive recognition by the state that he has met predetermined qualifications, and persons not so licensed are prohibited from practicing.

Minnesota Rules 4695.0800 Factors for Determining the Necessity of Regulation

Subpart 1. Consideration of factors. In the review of an applicant group questionnaire, the subcommittee, council, and commissioner shall base their recommendation or decision as to whether or not the applicant group shall be regulated upon the factors contained in Minnesota Statutes, section 214.001, subdivision 2.

Subpart 2. Factor of unregulated practice. In applying the factor of whether the unregulated practice of an occupation may harm or endanger the health, safety, and welfare of citizens of the state and whether the potential for harm is recognizable and not remote, at minimum the relevance of the following shall be considered:

A. harm shall be construed to be condition representative of physical, emotional, mental, social, financial, or intellectual impairment resulting from the functions rendered or failed to be rendered by the applicant group;

B. potential for harm may be recognizable when evidenced by at least one or more of the following: expert testimony; client, consumer, or patient testimony; research findings; legal precedents, financial awards, or judicial rulings;

C. potential for harm may be recognizable when evidence by at least one or more of the following characteristics of the applicant group;

(1) inherently dangerous nature of the applicant group's functions;

(2) dangerous nature of devices or substances used in performing applicant group's functions;

(3) exercise by practitioners of the applicant groups of an observable degree of independent judgment when: identifying or evaluating a consumer's or client's symptoms; formulating a plan for consumer or client care, service delivery or treatment; and/or providing consumer or client care, delivering service, or implementing a plan of treatment;

D. potential for harm may be remote when evidenced by at least one or more of the following: infrequent or rare instances of impairment; impairment which is minor in nature; or secondary or tertiary effects of the applicant group's function.

Subpart 3. Occupation requiring special skill factor. In applying the factor of whether the practice of an occupation requires specialized skill or training and whether the public needs and will benefit by assurances of initial and continuing occupational ability, the existence of the following items shall be considered as indicating that specialized skill or training or their continuation is required:

A. that the functions performed by the practitioner are several and their performance necessitates a thorough understanding of the complex relationship between those functions;

B. that the one or more functions performed by the practitioner requires a detailed understanding of the specific components of the function and the relationship between the functions and the symptoms, problem, or considion that function is intended to address or ameliorate;

C. that the absence of specialized skill or training is likely to increase the incidence and/or degree of harm as defined in subpart 2 to the consumer as client; and

D. that there occur frequent or major changes in areas of skilled knowledge and technique of which the practitioner must keep informed in order to meet current standards.

Subpart 4. Factor of more effective means. In applying the factor of whether the citizens of this state may be effectively protected by other means, at a minimum the relevance of the following shall be considered:

A. Indicators of protection by other means shall include but not be limited to:

(1) supervision by practitioners in a regulated occupation;

(2) existence of laws governing devices and substances used in the occupation;

(3) existence of laws governing the standard of practice;

(4) existence of standards for professional performance

(5) employment in licensed human service facilities which are required to employ competent staff;

(6) existence of federal licensing as credentialing mechanism;

(7) existence of civil service procedures which effectively screen potential employees for competence;

(8) graduation of members of the applicant group from an accredited educational institution or training program;

(9) mandatory participation in on-the-job training programs which are required by law or by professional organization of the occupation;

(10) existence of professional credentials and standards of performance which effectively sanction malpractice; and

(11) existence of a national certification process which effectively attests to the competency of recognized professionals.

B. Indicators of protection by other means shall be assessed and evaluated at least in view of the extent to which they:

(1) address all practitioners within an occupational group;

(2) appear sufficient to protect the general public from harm caused by the practice of the occupation in question;

(3) appear to be permanent and ongoing mechanisms.

Subpart 5. Overall cost effectiveness and economic impact. In determining whether the overall cost effectiveness and economic impact would be positive for citizens of the state, the following shall be considered:

A. Positive cost effectiveness and economic impact results where the benefits expected to accrue to the public from a decision to regulate an occupation are greater than the costs resulting from that decision.

(1) Cost effectiveness means the relationship of the benefits anticipated from a decision to regulate an occupation to the overall costs to the public resulting from that decision.

(2) Economic impact means the direct and indirect effects on the price and supply of services provided by the occupation under consideration for regulation. Direct effects include impacts on the cost and supply of practitioners who would be regulated. Indirect effect include: the degree to which the existing practitioners will be precluded from practice because of regulation; the degree to which persons aspiring to practice the occupation, who if not for regulation could practice the

occupation successfully, but will be prohibited because of inability to meet entry requirements; impact on ability of minorities or protected classes to enter occupation; or impact on innovations in the delivery of care or services as a result of regulation.

(3) Costs of a decision to regulate include the estimated costs to state and local governments of administering the proposed regulatory program; educational requirements and training costs includin costs associated with experiential requirements of the proposed mode of regulation; and costs to the public such as reduced or increased access by potential or existing providers to labor markets.

(4) Benefits of a decision to regulate an occupation includ access to less expensive but similar providers; measurable improvements i quality of care; reductions in costs of services; process for seeking redress for injury from malpractice, or other unprofessional conduct, an reduction in the potential for public harm from unregulated practice.

B. Cost effectiveness and economic impact can be evaluated through consideration of the following factors:

(1) degree to which regulation directly or indirectly impacts the costs and prices of goods or services provided by applicant group;

(2) impact upon the current and future supply of practitioners of the regulated occupation;

(3) degree to which existing practitioners will be precluded from practice because of regulation;

(4) impact, if any, on innovations in delivery of care or services as a result of regulation;

(5) costs of additional education and training required as a result of the regulation of the occupation;

(6) manner in which and degree to which regulation will result in improvement in the quality of care;

(7) degree to which services of the applicant group substitute for currently regulated occupations and estimated comparative cost of applicant group and currently regulated practitioners;

(8) degree to which services of the applicant group supplement currently regulated occupations;

(9) whether regulation confers or facilitate access to reimbursement for government assistance programs such as medicare and medicaid; estimated impact on programs and budgets; and

(10) impact on expenditures by government and private third party payors, if any, resulting from regulation of the occupation.

Appendix VII

NATIONAL COMMISSION FOR HEALTH CERTIFIED AGENCIES' CRITERIA FOR APPROVAL OF CERTIFYING AGENCIES

A certifying agency responsible for attesting to the competency of health care practitioners has a responsibility to the individuals desiring certification, to the employers of those individuals, to those agencies that reimburse for the services, and to the public. The National Commision for Health Certifying Agencies was formed to identify how those varying responsibility can be met and to determine if a certifying agency meets those responsiblities. Membership of a certifying agency in the Commission indicates that the certifying agency has been evaluated by the Commission and deemed to meet all of the established criteria. In order to be "approved" for membership in the Commission, a certifying agency[1] shall meet the following criteria:

1. Purpose of Certifying Agency

    a. shall have as a primary purpose the evaluation of those individuals who wish to enter, continue and/or advance in the health professions, through the certification process, and the issuance of credentials to those individuals who meet the required level of competence.

2. Structure

    a. shall be non-governmental;

    b. shall conduct certification activities which are national in scope;

    c. shall be administratively independent[2] in matters pertaining to certification, except appointment of members of the governing body of the certifying agency. A certifying agency which is not a legal entity in and of itself shall provide proof that the agency's governing body is administratively independent in certification matters from the organization of which it is a part;

    d. shall have a governing body which includes individuals from the discipline being certified. A certifying agency which certifies more than one discipline or more than one level within a discipline shall have representation of each on the governing body;

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[1] The term "certifying agency" as used in this document means an independent not-for-profit certifying agency or a not-for-profit association with a certifying component.

[2] Administratively independent means that all policy decisions relating to certification matters are the sole decision of the certifying body and not subject to approval by any other body, and that all financial matters related to the operation of the certifying component are segregated from those of the professional association.

e. shall require that members of the governing body who represent the certified profession shall be selected by the certified profession or by an association of the certified profession and such selection shall not be subject to approval by any other individual or organization;

f. shall have formal procedures for the selection of members of the governing body which shall prohibit the governing body from selecting its successors;

g. shall provide evidence that the public consumer and the supervising professional and/or employers of the health professionals have input into the policies and decisions of the agency, either through membership on the governing body or through formalized procedures as advisors to the governing body. This criterion is effective January 1, 1981; and

h. the certifying body of a professional organization shall be separate from the accrediting body of the professional association.

3. Resources of Certifying Agencies

a. shall provide evidence that the agency has the financial resources to properly conduct the certification activities;

b. shall provide evidence that the staff possesses the knowledge and skill necessary to conduct the certification program or has available and makes use of non-staff consultants and professionals to sufficiently supplement staff knowledge and skill.

4. Evaluation Mechanism

a. shall provide evidence that the mechanism used to evaluate individual competence is objective, fair and based on the knowledge and skills needed to function in the health profession;

b. shall have a formal policy of periodic review of evaluaton mechanisms and shall provide evidence that the policy is implemented to insure relevance of the mechanism to knowledge and skills needed in the profession;

c. shall provide evidence that appropriate measures are taken to protect the security of all examinations;

d. shall provide evidence that pass/fail levels are established in a manner that is generally accepted in the psychometric community as being fair and reasonable. This criteria is effective January 1, 1981, after standards are established; and

e. shall provide evidence that the evaluation ude evidence of attempts to establish both reliability and validity for each form of the examination.

5. Public Information

   a. shall publish a document which clearly defines the ceritification responsibilities of the agency and outlines any other activities of the agency which are not related to certification;

   b. shall make available general descriptive materials on the procedures used in test construction and validation and the procedures of administration and reporting of results;

   c. shall publish a comprehensive summary or outline of the information, knowledge, or functions covered by the test; and

   d. shall publish at least annually, a summary of certification activities, including number tested, number passing, number failing, number certified and number recertified (if agency conducts a recertification program).

6. Responsibility on Applicants for Certification or Recertification

   a. shall not discriminate among applicants as to age, sex, race, religion, national origin, handicap or marital status and shall include a statement of non-discrimination in announcement of the certification program;

   b. shall provide all applicants with copies of formalized procedures for application for, and attainment of, certification and shall provide evidence to the Commission that such procedures are uniformly followed and enforced for applicants;

   c. shall have a formal policy for the periodic review of application and testing procedures to insure that they are fair and equitable and shall give evidence to the Commission of the implementation of the policy;

d. shall publicize nationally appropriate data concerning certification program including eligibility requirements for certification, basis of examination, dates and places of examinations;

e. shall provide evidence that competently proctored testing sites are readily accessible in all areas of the nation at least once annually;

f. shall publicize nationally the specific education background or employment backgound required for certification;

g. shall given evidence that a means exists for individuals who have obtained a skill or knowledge outside the formal educational setting to be evaluated and obtain certification or in the absence of such means, provide reasonable justification for exclusion. These means employed should be consistent with the evaluation standards. The criterion is effective January 1, 1982;

h. shall provide evidence of uniformly prompt reporting of test results to applicants;

i. shall provide evidence that applicants failing the examination are given information on general areas of deficiency;

j. shall provide evidence that each applicant's test results are held confidential;

k. shall have a formal policy on appeal procedures for applicants questioning examination results and shall publish this information in examination announcements; and

i. shall have a formal policy, acceptable to the Commission, delineating grounds, based on applicants prior or current conduct, for refusing applicants eligibility to take the certification examination and shall provide applicants the opportunity to present their cases to an impartial decisionmaker in the event of denial of eligibility or denial certification. (Effective January 1, 1987)

7. Responsibilities to the Public and to Employers of Certified Personnel

a. shall drive to insure that the examination adequately measures the knowledge and skill required for entry, maintenance and/or advancement into the profession;

b. shall provide evidence that the agency awards certification only after the skill and knowledge of the individual has been evaluated and determined to be acceptable;

c. shall periodically publish a list of those persons certified by the agency;

d. shall have a formal policy and procedure for discipline of certificants, including the sanction of revocation of the certificate, for conduct which clearly indicates incompetence, unethical behavior and physical or mental impairment affecting performance that is acceptable to the Commission, These procedures shall incorporate due process. (Effective January 1, 1987);

e. any title or credential awarded by the credentialing body shall appropriately reflect the practitioner daily occupatonal duties and shall not be confusing to employers, consumers, health professionals and/or other interested parties effective January 1, 1985);

The memberhship Committee may consider the following factors in determining whether practitioner's titles or credentials comply with this criterion:

(i) educational background;

(ii) function of profession;

(iii) occupational duties and breadth of these activities;

(iv) level of supervision by other practitioners, or of any other practitioners; and

(v) various titles already in the field, other titles considered, and a justification of why these titles were not utilized or why they were changed.

8. Recertification[3]

a. shall have in existence or shall be in the process of developing a plan for periodic recertification:

b. shall provide evidence that any recertification program is designed to measure continued competence or to enhance the continued competence of the individual.

9. Responsibilities to Commission

a. shall provide the Commission on a regular basis with copies of all publications related to the certifying process;

b. shall advise the Commission of any change in purpose, structure or activities of the certifying agency;

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[3] In this document the term "recertification" includes periodic renewal or revalidatin of certification based on re-examination, continuing education or other methods developed by the certifying agency. This criterion is effective January 1, 1982.

c. shall advise the Commission of substantive change in test administration procedures;

d. shall advise the Commission of any major changes in testing techniques or in the scope or objectives of the test; and

e. shall undergo re-evaluation by the Commission at five year intervals.

Amended December, 1984.

In this document the term "recertification" includes periodic renewal or revalidation of certification based on re-examination, continuing education or other methods developed by the certifying agency. This criterion is effective January 1, 1982.

Appendix VIII

LIST OF HISTORICAL SOURCE MATERIAL

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